Overview

This manual provides physical descriptions and describes how to service components of the Catalyst computer subsystem. This manual contains the following sections:

- Physical Description of the User Computer
- Physical Description of the Test Computer
- Networking Description
- Servicing the SS5 and Ultra 1 User Computers
- Servicing the Ultra 5, Ultra 10, and Ultra 60 Computer
- Servicing the ELMA Test Computers
- Software Commands and Tests
- Global Customer Service (GCS) Centers (FRUs)

Computer Subsystem

The Catalyst computer subsystem contains two Sun® Microsystems workstations referred to as the user computer and the test computer. The test computer interacts with the user computer to provide information to the test system. During normal test system operations, the test computer sends data to and receives data from the user computer via the Ethernet connection and a serial connection (see the chapter Networking Description for more information). Upon receiving data from the user computer, the test computer processes and sends data to the test system via data buses. The test system receives the data, interprets it, and performs the designated task.

The figure Computer Subsystem Flow Diagram provides a block diagram of the computer subsystem connections.

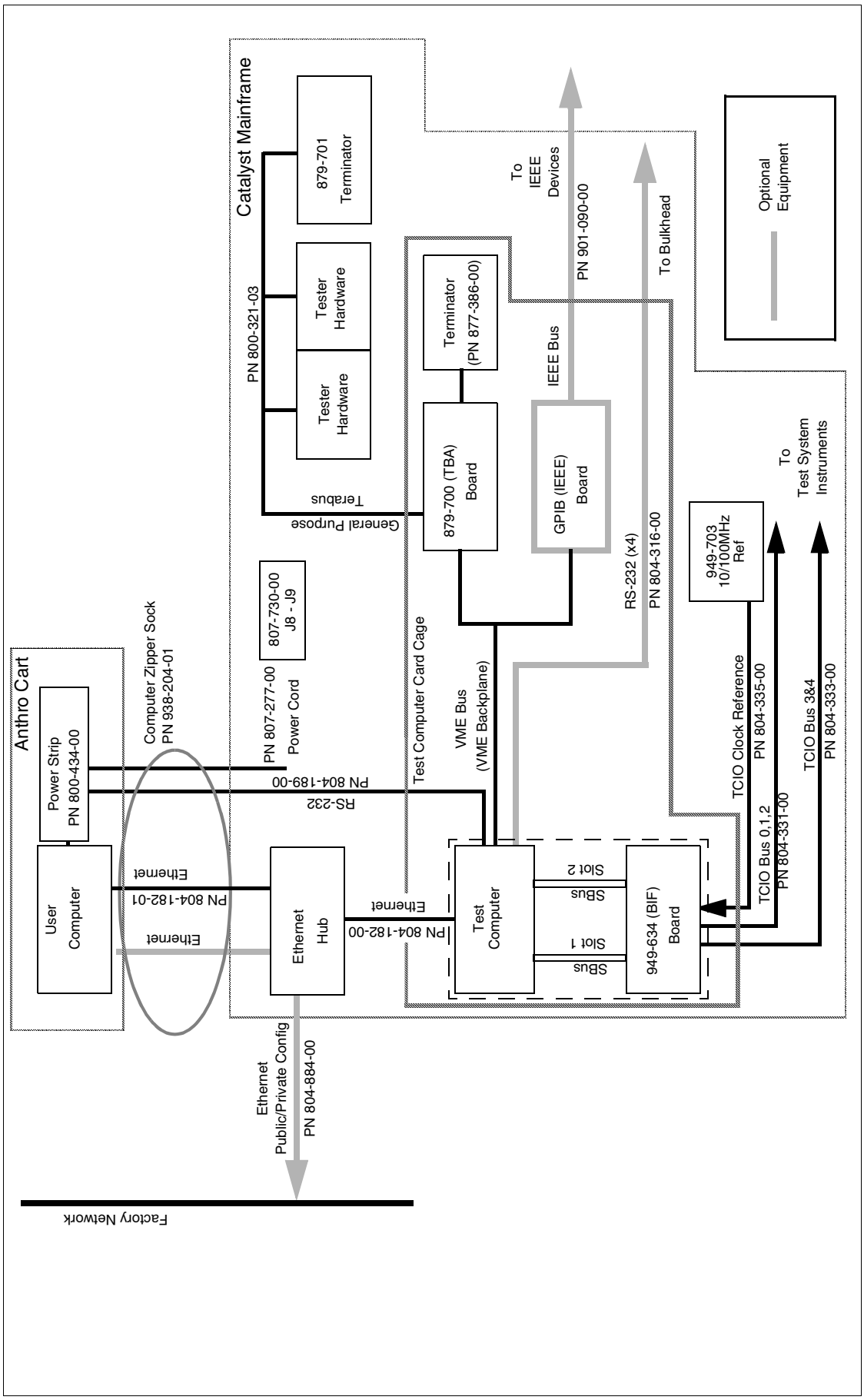
The user computer performs the following functions:

- Provides the user with test program development and data analysis capabilities.
- Controls the disk, tape, and CD-ROM units as well as providing graphical user interfaces. (Ultra 5 models do not contain a tape drive.)
- Supplies the network communications for the test system (in some older Catalyst configurations). New Ethernet hub systems (Magnum 600 ES) do not use the user computer as a gateway.
- Acts as a server and hard disk for the test computer.

The test computer performs the following functions:

- Controls the test system hardware during program execution.
- Performs advanced math operations.
- Acts as a client in the network communications.

Computer Subsystem Flow Diagram



Overview

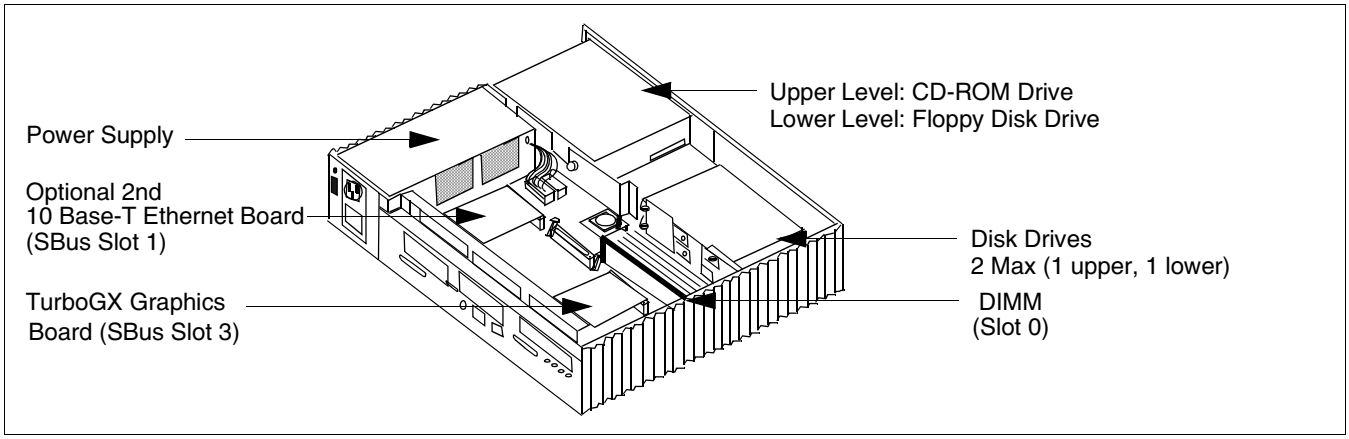
The Catalyst test system uses Sun Scalable Processor ARChitecture (SPARC) based workstations as the user computer. The user computer resides on an anthro cart outside of the system and connects to the mainframe cabinet via a cable trunk. There are three types of user computer available: SPARCstation 5, Ultra 1, and Ultra 5. The following sections describe the components and options for each computer:

- SPARCstation 5 User Computer
- Ultra 1 User Computers
- Ultra 5 User Computers
- External User Computer Options
- Sun Blade 1500 User Computer

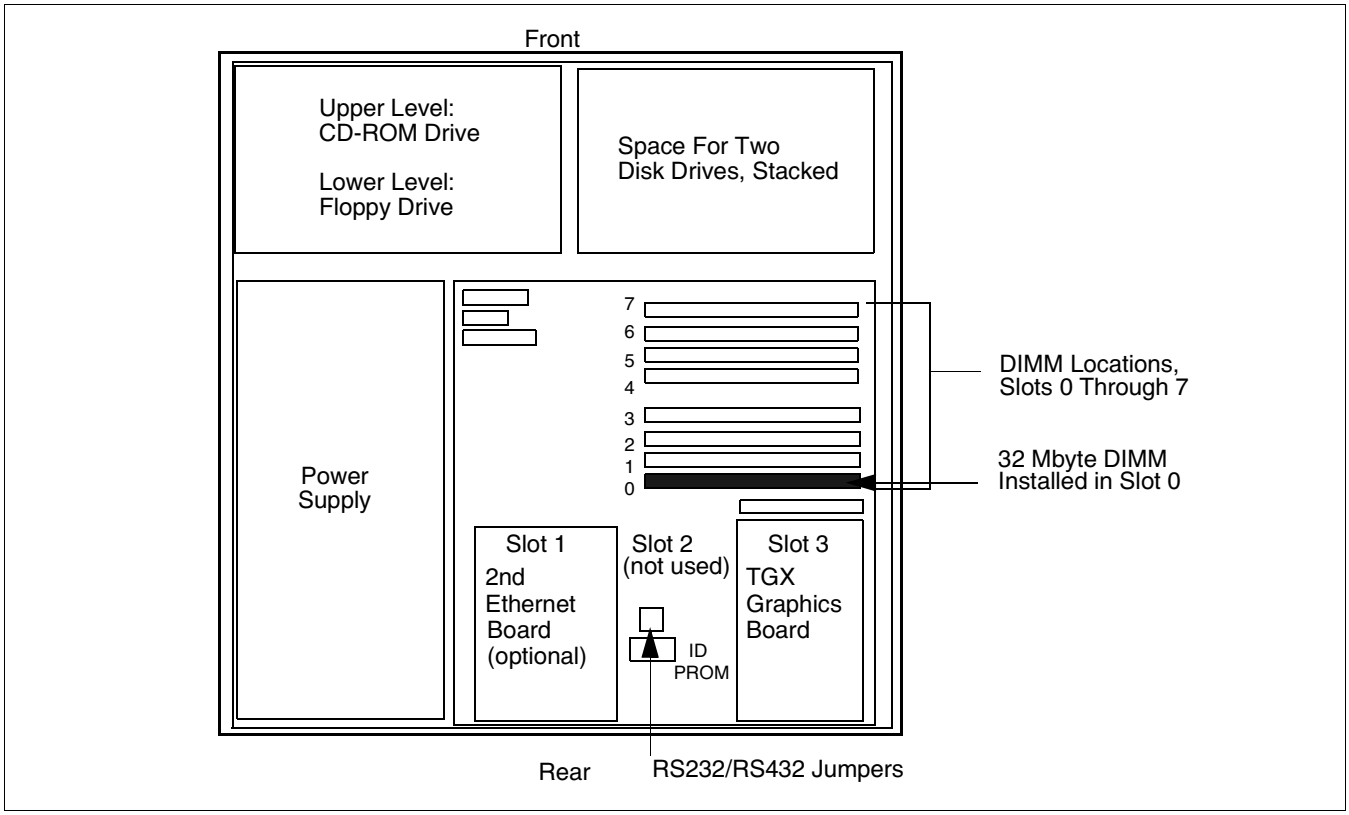
SPARCstation 5 User Computer

The SPARCstation 5 (SS5) is a workstation with a 170 MHz SuperSPARC CPU, a TurboGX graphics board, and a 2.1 or 4.3 Gbyte internal drive. The standard SS5 has 32 Mbyte of RAM and has internal space for up to two hard drives, an internal floppy drive, and an internal CD-ROM drive. It is used in Catalyst “production” system configurations.

The internal components of the SS5 vary depending on the customer’s configuration. See the figure Internal Component Locations in the SS5 and SS5 Internal Components - Top View for an internal view of the SS5.



Internal Component Locations in the SS5



SS5 Internal Components - Top View

SS5 Specifications

The technical specifications for the SS5 are listed in the table SS5 Specifications.

SS5 Specifications

Description	SS5 Specification
Processor	170 MHz SuperSPARC processor
RAM	32 Mbyte
Hard Disk	One or two 2.1 Gbyte internal drive(s) or 4.3 Gbyte internal drives
Disk Drives	Two max (one upper, one lower)
Graphics	TurboGX linear frame buffer
Bus	Three 32-bit SBus slots
Network	Twisted-pair, 10Base-T Ethernet standard, auto-sensing 10/100Base-T in an installed card with necessary driver
I/O Ports	Two RS232 serial, one parallel
Monitor	21 inch color
Floppy	3.5 inch 1.44 Mbyte
CD-ROM	4x or faster SCSI
SCSI	50 pin Narrow, fast SCSI-2

Processor

The SS5 has a 170 MHz SuperSPARC CPU.

RAM

The SS5 has eight DIMM slots. The minimum memory configuration is two 32 Mbyte DIMMs.

SBus Slots

The SS5 has three SBus slots, they are used as follows:

- Internal graphics board (the TurboGX) occupies one SBus slot
- Space is available for two more SBus options
- The optional second Ethernet controller board, if present, occupies one slot

For newer Catalysts the second Ethernet controller should always be present.

Note

The Ethernet card is an autosensing 10/100Base-T. The connection on the mother board is only 10Base-T.

SS5 Connectors

The following connectors are located on the rear panel of the SS5 computer (see the figure Connectors on the SS5 Computer):

- [A] SCSI connector (type - HD80 Narrow SCSI)

  Connects peripheral devices (such as an external disk drive, the tape drive, etc.) Peripheral devices have two SCSI connectors to allow daisy-chaining connections to the SCSI bus.

Note

Be sure to terminate the last device in the SCSI chain if the last device is not self-terminating.

- [B] AUI connector

  Requires Sun pig-tail adapter to convert from high density Sun connector to standard AUI connector (included with workstation kit).
- [C] 10Base-T Ethernet connector (type = RJ45)

  Connects to 10Base-T Hub (Systems with the Magnum series hub will not utilize this port).
- [D] Two (2) serial port connectors (type = DB25F

  Serial port A (or TTYA) and serial port B (or TTYB).
- [E] Keyboard / mouse connector (type = DIN8)

  Connects the keyboard and mouse to the user computer CPU via a keyboard cable.
- [F] Monitor connector (type = DB13W3)

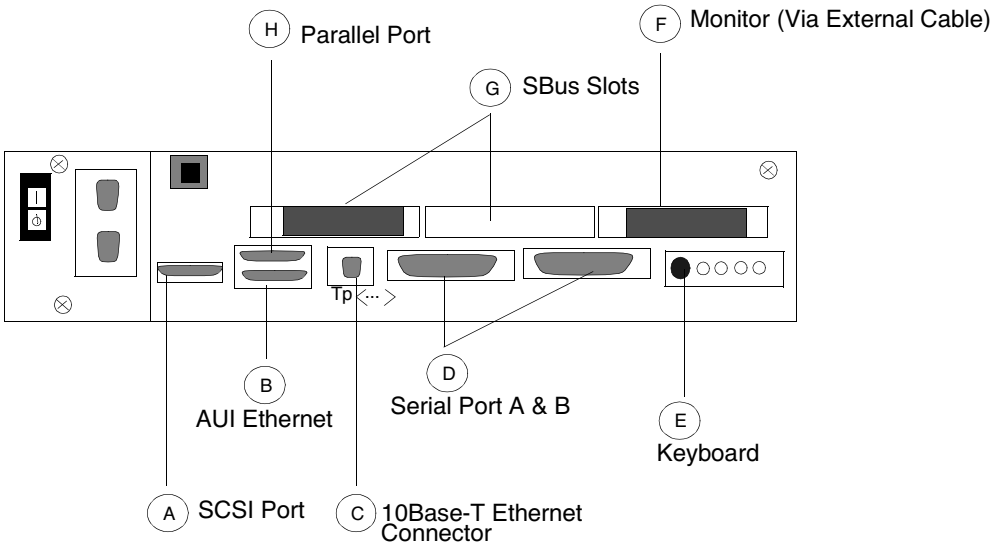
  Connects to the monitor via a cable.
- [G] SBus slots [G]

  One can be used for an optional second Ethernet controller board.
- [H] Parallel connector

  Connects to a parallel device (not used).

Note

The computer equipment configuration can vary and not all connectors may be used.



Connectors on the SS5 Computer

Ultra 1 User Computers

There are two different Ultra 1 Series workstations currently in use:

- Sun Ultra 140
- Sun Ultra 170E

Visually, the only difference between the 140 and the 170E workstations is in the logos located on the right front panel. The Ultra 140 logo is Ultra 1 while the 170E says Ultra 1 with the word Creator centered underneath it. However, there are slight differences between each system: processor speed, UPA Slot w/Creator graphics board, Wide SCSI Support and a 100 Mbit Ethernet onboard.

The Ultra 1 user computer is used with the Catalyst “engineering” system configuration and it is configured with dual monitors.

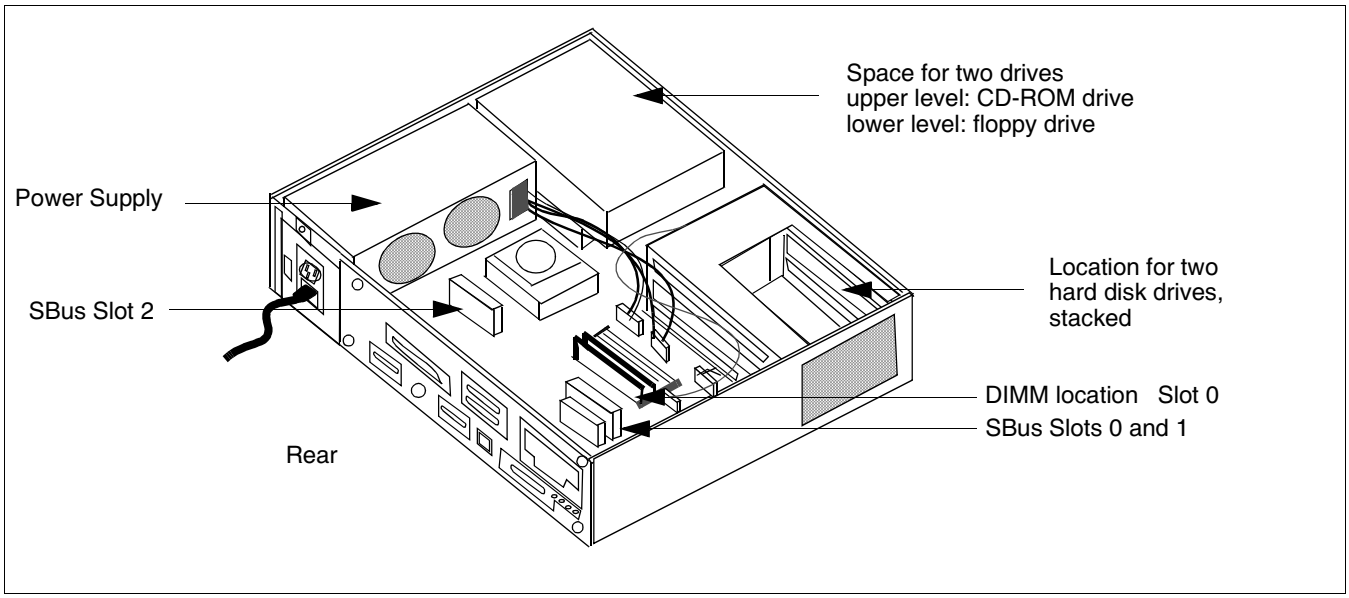
Sun Ultra 140

The Sun Ultra 1-140 is a workstation with a 140 MHz UltraSparc CPU, a TurboGX graphics board and an internal power supply. The standard Ultra 140 has 64 Mbyte of RAM and internal space for up to two hard drives, an internal floppy drive, and an internal CD-ROM drive. The Ultra 140 has three SBUS slots, as opposed to the Ultra 170E, which has two. Additionally, the Ultra 140 supports only 10Base-T Ethernet connections, not 10/100Base-T.

Sun Ultra 170E

The Sun Ultra 170E is a workstation with a 170 MHz UltraSparc CPU, a Creator Graphics board (for single monitor), a TurboGX graphics board (used in addition to the Creator board when a second monitor is used), and an internal power supply. The standard Ultra 170E has 128 Mbyte of RAM and internal space for up to two hard drives, an internal floppy drive, and an internal CD-ROM drive. The Ultra 170E has two SBUS slots, as opposed to the Ultra 1-140, which has three. The Ultra 170E supports both 10Base-T and 10/100Base-T connections.

The internal components of the Ultra series vary depending on the customer's configuration. See the figure Internal Component Locations in the Ultra 1 Series for an internal view of the Ultra.



Internal Component Locations in the Ultra 1 Series

Ultra 1 Specifications

The technical specifications for the Ultra 140 and 170E are listed in the table Ultra 1 Specifications.

Ultra 1 Specifications

Description	Ultra 1-140	Ultra 1-170E
Processor	143 MHz UltraSPARC	167 MHz UltraSPARC
RAM	64 Mbyte (two 32 Mbyte DIMMS)	128 Mbyte (two pairs of -32 Mbyte DIMMS)
Hard Disk	One or two 2.1 Gbyte internal drive	One or two 2.1 Gbyte internal drive or one 4.2 Gbyte internal drive (two drives will fit)
Graphics	TurboGX linear frame buffer(s)	TurboGX linear frame buffer(s) and Creator Graphics frame buffer board
Bus	Three 64-bit SBus slots	64-bit SBus

Description	Ultra 1-140	Ultra 1-170E
Network	10-Base-T Ethernet standard	10/100-Base-T Ethernet standard (auto sensing)
Slots	3 SBus	2 SBus, 1 UPA
Ports	2 RS-232 serial, 1 parallel	2 RS-232 serial, 1 parallel
Monitor	One or two 20 or 21 inch color monitors	One or two 20 or 21 inch color monitors
Floppy	3.5 inch 1.44 Mbyte	3.5 inch 1.44 Mbyte
CD-ROM	644 Mbyte 4x or faster	644 Mbyte 12x or faster
SCSI	50 pin Narrow SCSI-2	68 pin Fast Wide SCSI-2
Ethernet	10Base-T	10/100Base-T

Processor

The Sun Ultra 1-140 has a 140 MHz UltraSparc CPU. The Sun Ultra 1-170E has a 170 MHz UltraSparc CPU.

RAM

The Ultra series have eight DIMMs slots. The Ultra memory configuration is two 32 Mbyte DIMMs. (DIMMs must be installed in pairs in the Ultra 1-140).

Note

The DIMMs for the Ultra series and SS5 user computers are NOT interchangeable.

SBus Slots

- Total of three SBus slots available in Ultra 1-140; two available in Ultra 1-170E.

  The primary Ethernet controller board mount on the main logic board, permitting a second Ethernet controller board to be mounted in one of the available SBus slots.
- Internal graphics board (the TurboGX) occupies one SBus slot (if Creator board is present it occupies the UPA slot).

  A second graphics card is installed for the second monitor.
- The optional second Ethernet controller board may occupy a second SBus slot.

Ultra 1 Connectors

The following connectors are located on the rear panel of the Ultra series workstation (see the figure Ultra 1 Workstation Connectors):

- [A] Audio connectors

- [B] SCSI connector (140 type = HD 50; 170E type = HD68)

  Connects peripheral devices (such as an external disk drive, a tape drive, etc.). Peripheral devices have two SCSI connectors to allow daisy-chaining connections to the SCSI bus.
- [C] Ethernet connector (140 = 10Base-T; 170E = 10/100 Base-T)

  Connects to the 10/100Base-T or 10Base-T Hub (RJ-45F).
- [D] AUI connector

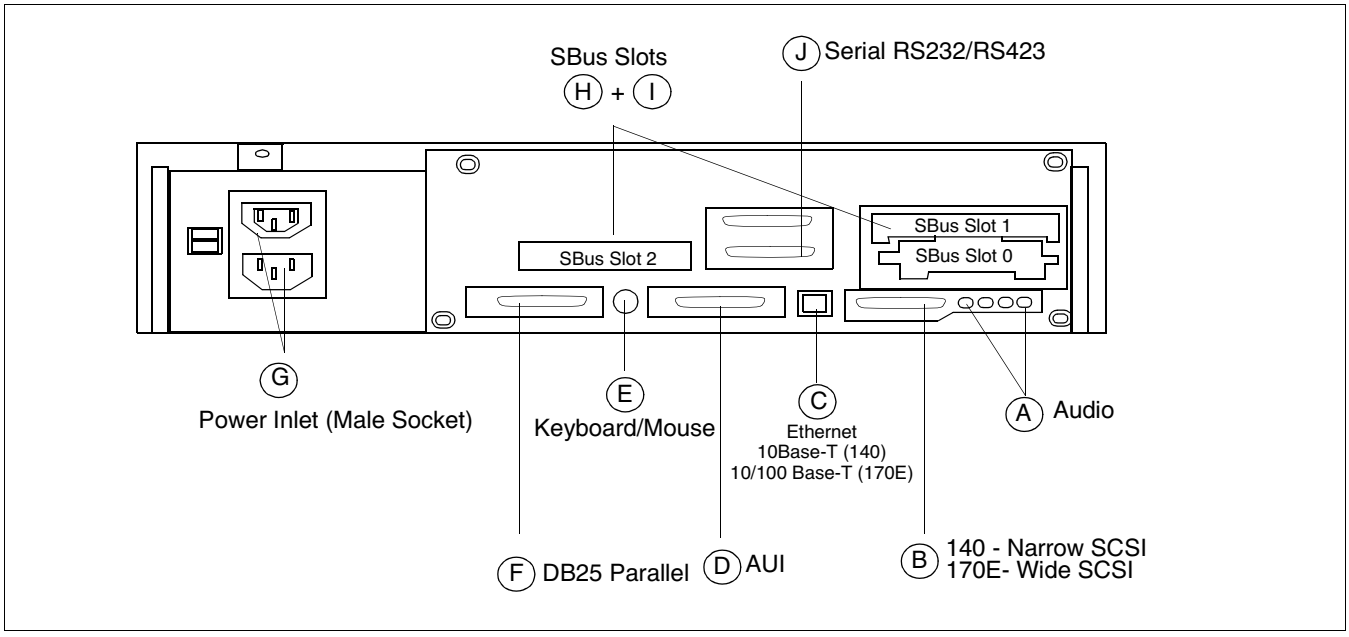
  Requires Sun pig-tail adapter to convert from specific Sun connector to real AUI connector.
- [E] Keyboard / mouse connector

  Connects the keyboard and mouse to the user computer CPU via a keyboard cable (Din 8F).
- [F] Centronics-compatible (DB25) parallel connector
- [G] Power Outlet and Inlet
- [H] Three SBus connectors (140) or two SBus connectors and one UPA connector (170E)
- [I] Monitor connector(s) (SBus slot(s))

  Connect video signals to the monitor via a cable (DB13W3 F).
- [J] Two (2) serial connectors (RS232/RS423) (DB-25 F).

Note

Computer configurations may vary. Not all connectors listed previously or shown in the figure Ultra 1 Workstation Connectors may be present.



Ultra 1 Workstation Connectors

Ultra 5 User Computers

There are two Ultra 5 series workstations currently in use: the Ultra 5+ “engineering configuration” (with dual monitors) and the Ultra 5 “production configuration” (with single monitor). The systems look the same visually. However, there are slight differences between each system: processor speed, memory and hard drive.

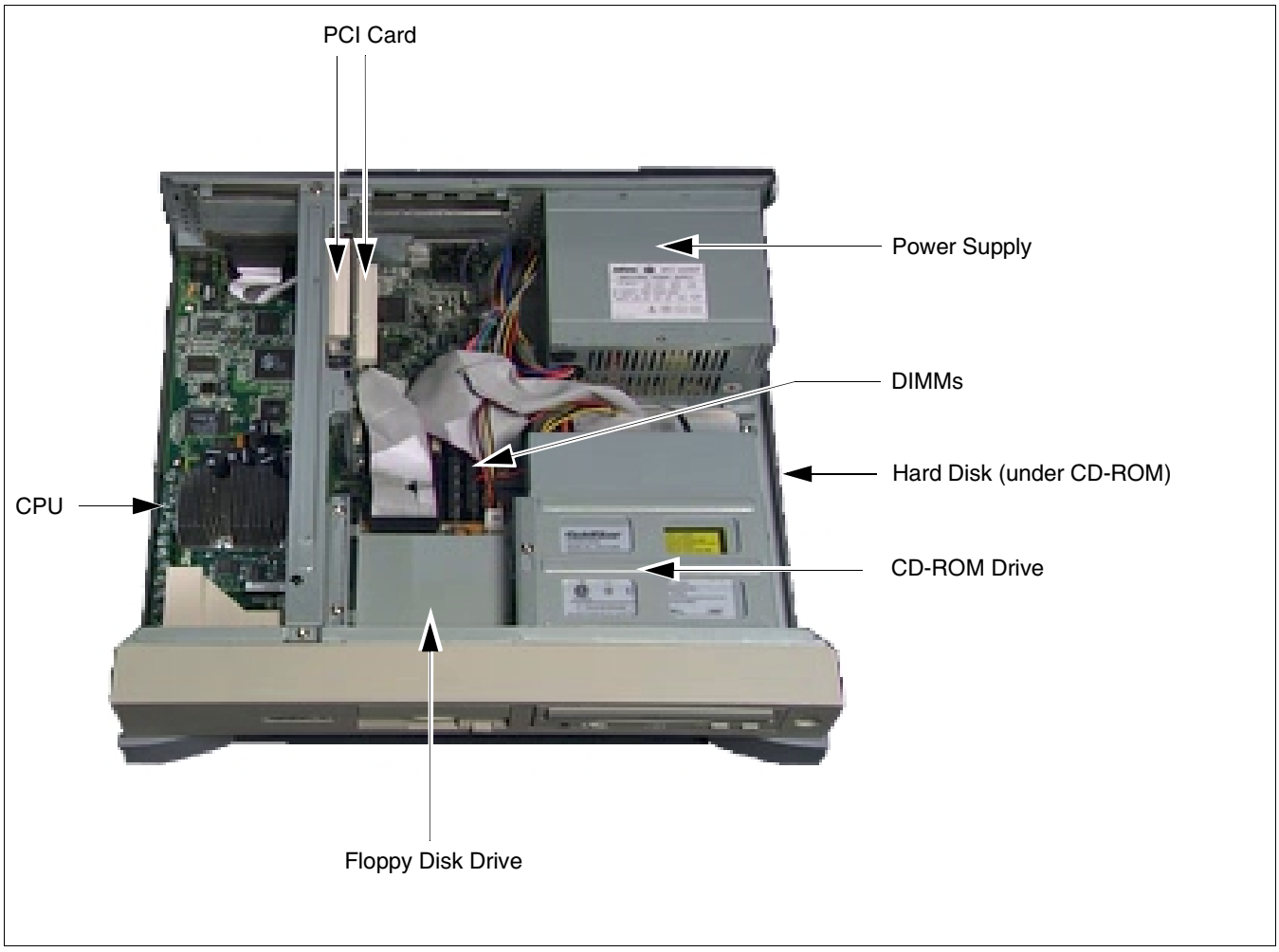
Sun Ultra 5 Engineering Configuration

The Sun Ultra 5+ engineering configuration is a workstation with a 333 MHz UltraSPARC IIi CPU, 9.1 Gbyte internal hard drive, graphics board and an internal power supply. The standard Ultra 5+ engineering configuration has 256 Mbyte of RAM, 4 DIMM slots and an internal CD-ROM drive. The Ultra 5+ engineering configuration supports 10/100Base-T Ethernet connections.

Sun Ultra 5 Production Configuration

The Sun Ultra 5 production configuration is a workstation with a 270 or 360 MHz UltraSPARC IIi CPU, 4.3 Gbyte internal hard drive, graphics board and an internal power supply. The standard Ultra 5+ production configuration has 128 Mbyte of RAM, 4 DIMM slots and an internal CD-ROM drive. The Ultra 5+ production configuration supports 10/100Base-T Ethernet connections.

The internal components of the Ultra series vary depending on the customer's configuration. See the figure Internal Component Locations in the Ultra 5 Series.



Internal Component Locations in the Ultra 5 Series

Ultra 5 Specifications

The technical specifications for the Ultra 5+ user computers are listed in the table Ultra 5 Specifications.

Note

The Sun Ultra 5 with a 270 MHz UltraSPARC IIi processor was discontinued in October 1999. The 360 MHz UltraSPARC IIi replaced it as the Ultra 5 Production Configuration.

Ultra 5 Specifications

Description	Ultra 5+ Engineering Configuration	Ultra 5 Production Configuration
Processor	333 MHz UltraSPARC IIi	270 or 360MHz UltraSPARC IIi
RAM	256 Mbyte (two 128 Mbyte DIMMS)	256 Mbyte (two 128Mbyte DIMMS)
Hard Disk	9.1 Gbyte internal drive	4.3 Gbyte internal drive

Description	Ultra 5+ Engineering Configuration	Ultra 5 Production Configuration
Graphics	PGX24 frame buffer	PGX24 frame buffer
Bus	Primary: one PCI bus - 32-bit, 6 -MHz, 3.3 Vdc Secondary: PCI bus A - 32 bit, 33 MHz, 5 Vdc PCI bus B - 32 bit, 33 MHz	Primary: one PCI bus - 32-bit, 6 MHz, 3.3 Vdc Secondary: PCI bus A - 32 bit, 33 MHz, 5 Vdc PCI bus B - 32 bit, 33 MHz
Network	10/100-Base-T Ethernet (auto sensing)	10/100-Base-T Ethernet (auto sensing)
Slots	3 short. 33 MHz	3 short 33 MHz
Monitor	Dual 21 inch color	Single 21 inch color
Floppy	1.44 Mbyte internal floppy drive	1.44 Mbyte internal floppy drive
CD-ROM	32x internal drive	32x internal drive
SCSI	none onboard	none onboard

Processor

The Sun Ultra 5+ engineering configuration has a 333 MHz UltraSPARC IIi CPU. The Sun Ultra 5 production configuration is a workstation with a 270 or 360 MHz UltraSPARC IIi CPU.

RAM

The Ultra 5+ engineering configuration ships with 256 Mbyte of RAM (two 128 Mbyte DIMMS (pn 425-435-02)).

The Ultra 5 production configuration ships with 256 Mbyte of RAM (two 128 Mbyte DIMMS (pn 425-435-02)).

Both the engineering and production configurations of the Ultra 5 require that memory be installed in pairs.

Note

The DIMMs for the Ultra series and SS5 user computers are not interchangeable. The DIMMS for the Ultra 1 and Ultra 5 are not interchangeable.

Peripheral Component Interconnect (PCI) Bus

The Ultra 5 computer utilizes a standard PCI bus architecture. The PCI bus interconnects optional boards such as a SCSI, second video, GPIB or RS232 serial port interface to the main computer. These optional PCI devices plug into an available PCI slot where their connectors protrude from the back of the computer for interconnection purposes.

The Ultra 5 has 3 PCI slots. The PCI bus is a 33 MHz bus. PCI slots are superheated into long and short categories. The long and short refer to the size PCI board that can physically be installed into the machine.

Previous computers used SBus architecture.

Ultra 5 Connectors

The following connectors are located on the rear panel of the Ultra 5 series workstation (see the figure Ultra 5 Workstation Connectors):

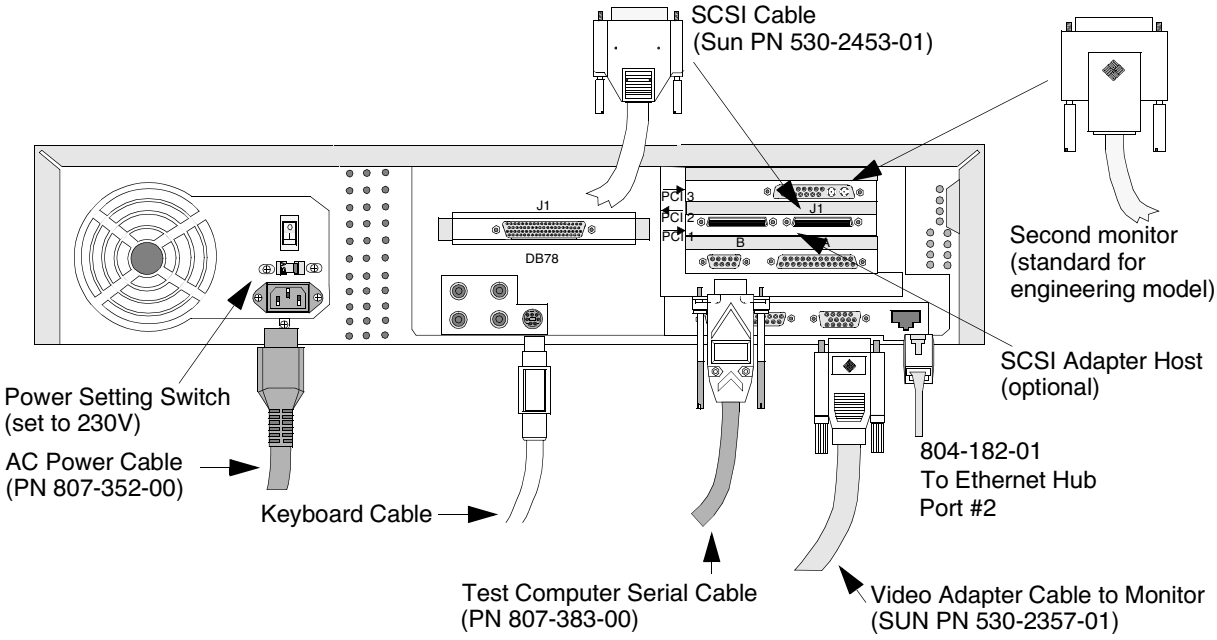
! Caution

All Catalysts must be set to the 230V position. See the figure Ultra 5 Workstation Connectors.

- Power inlet
- Keyboard / mouse connector - connects the keyboard and mouse to the user computer CPU via a keyboard cable
- SCSI host adapter connector (SCSI is not standard - a SCSI host adapter card (pn 425-431-00) can be installed in PCI slot 1)
- Ethernet connector
- Monitor connector
- Test computer cable

Note

Computer configurations can vary. Not all connectors listed previously or shown in the figure Ultra 5 Workstation Connectors may be present.



Ultra 5 Workstation Connectors

External User Computer Options

This section describes the external options available for the user computer. The options for the SS5 user computer are listed in the table Optional External SS5 Components. The options for the Ultra user computer are listed in the table Optional External Ultra 1 Components and Optional External Ultra 5 Components.

Optional External SS5 Components

Part Number	Description
425-341-01	External 2.5 Gbyte 1/4 inch tape drive
425-328-04	External 4 Gbyte disk drive

Optional External Ultra 1 Components

Part Number	Description
425-341-01	External 2.5 Gbyte 1/4 inch tape drive
425-328-04	External 4 Gbyte disk drive
425-406-00	Second monitor for Ultra Note: requires wide computer cart pn 425-310-02 and includes a second graphics board

Optional External Ultra 5 Components

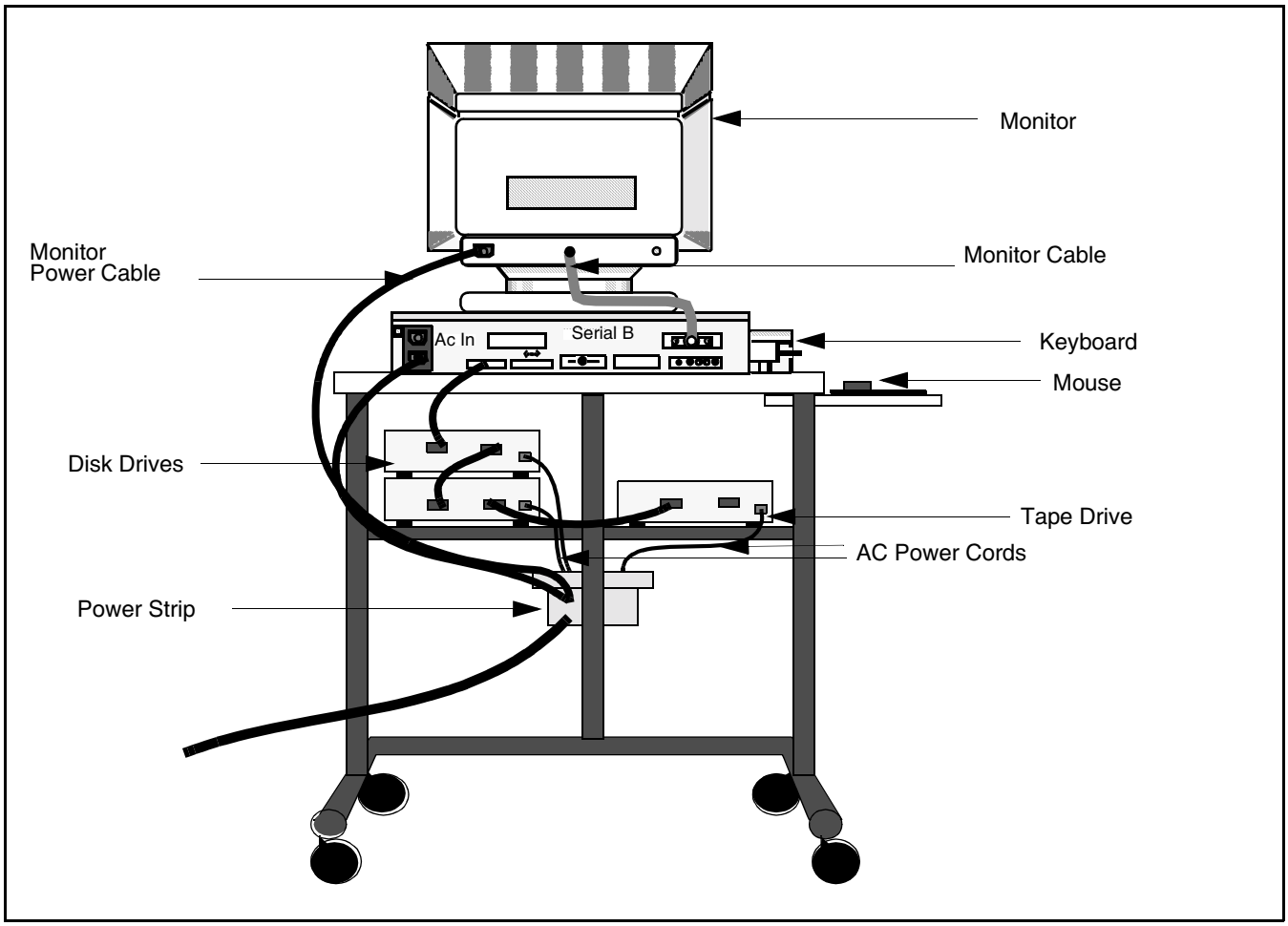
Part Number	Description
806-844-00	External 9.1 Gbyte disk drive kit
807-607-00	Second monitor kit for Ultra Note: requires wide computer cart pn 425-310-02 and includes a second graphics board

Location of User Computer Options

Optional external user computer peripherals, such as tape drives, disk drives, and second monitors, are located on the computer cart.

SS5 External Options

The figure SS5 User Computer Peripherals shows the location of external peripherals on the user computer cart.

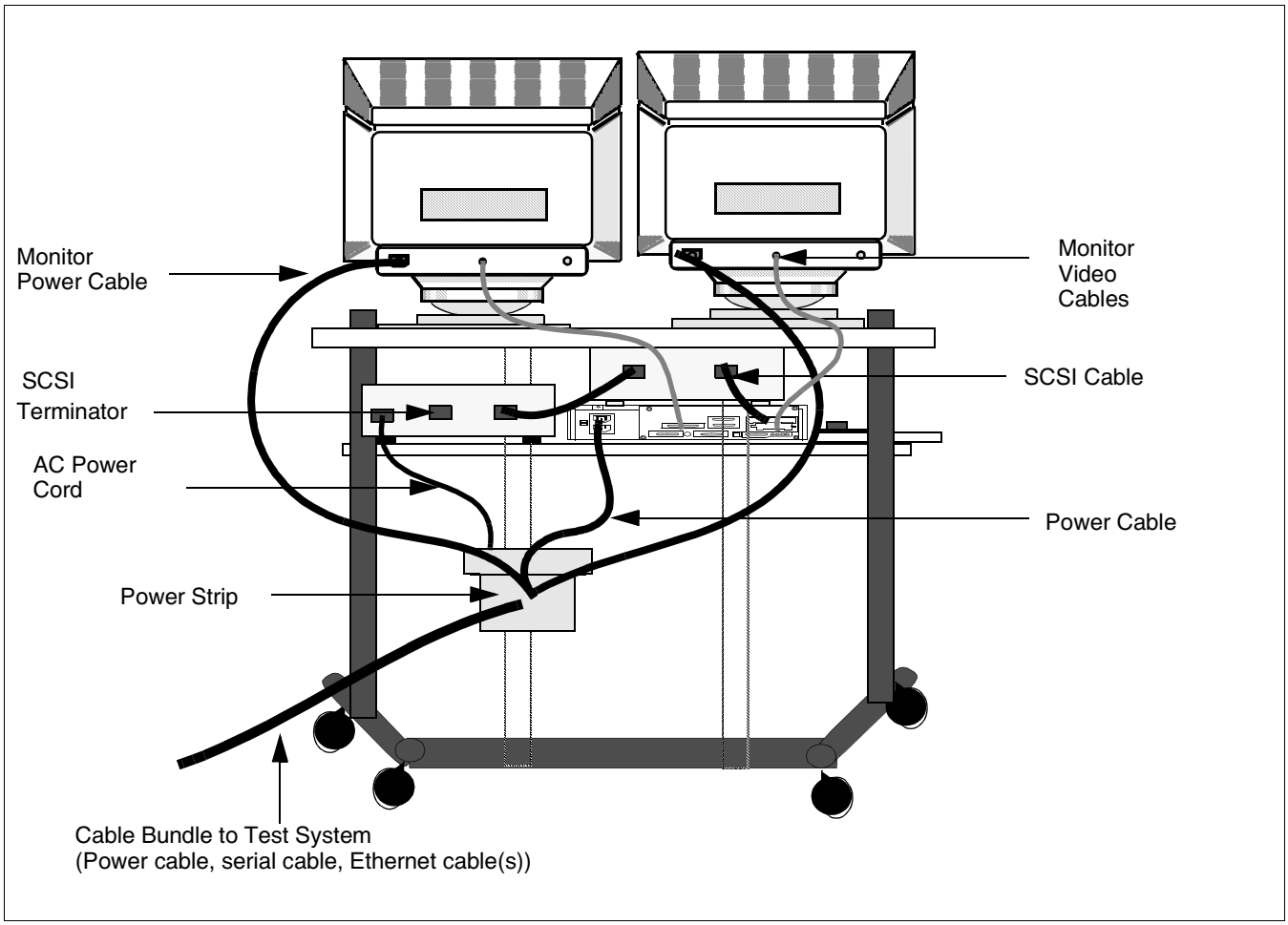


SS5 User Computer Peripherals

Ultra External Options

The Ultra may ship with one or two monitors. The Ultra with two monitors must be installed on the wide computer cart, as shown in the figure Ultra User Computer Peripherals.

This figure also shows the cabling of the Ultra with external peripherals and two monitors.

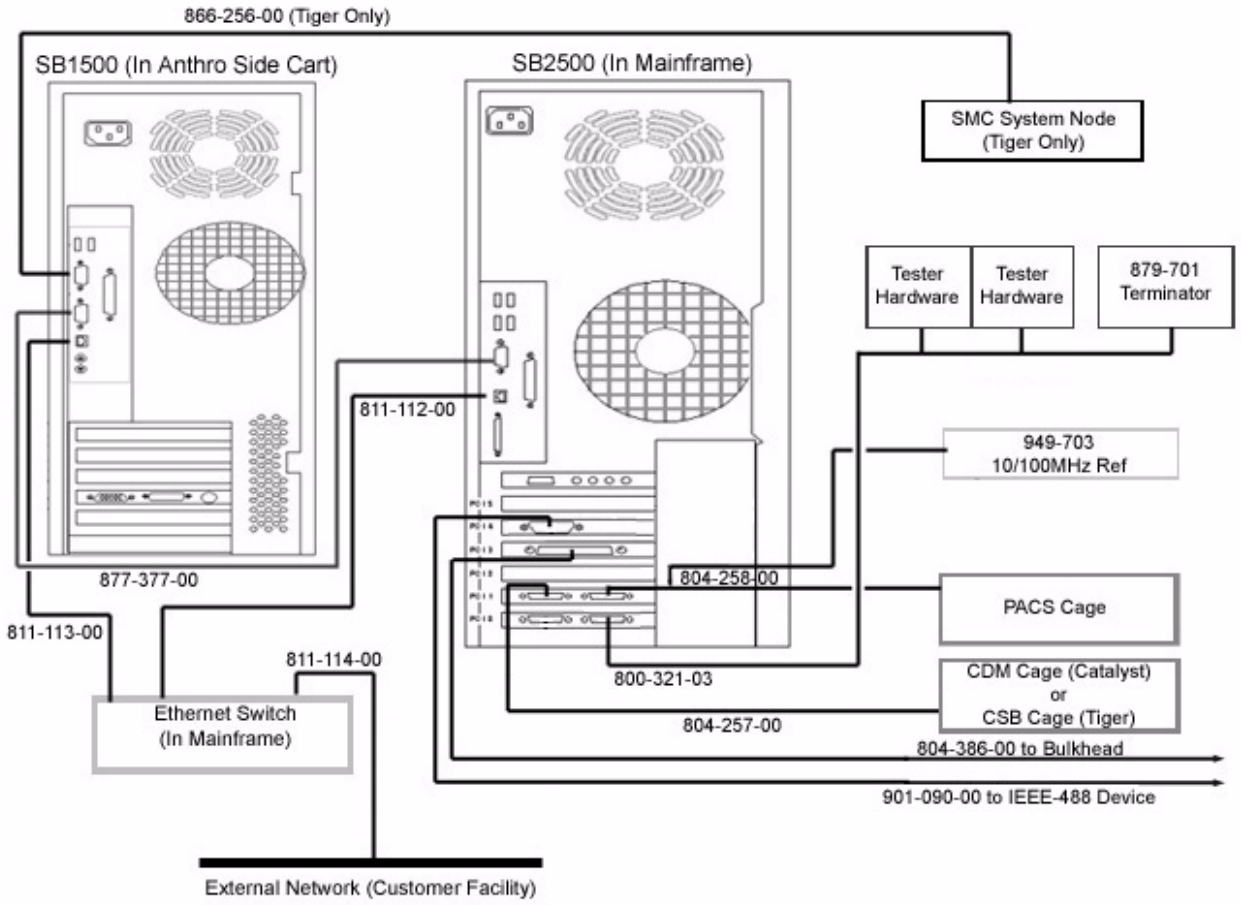


Ultra User Computer Peripherals

The figure Tiger Computer Subsystem Connections shows a complete layout of the Tiger computer subsystem and its connections.

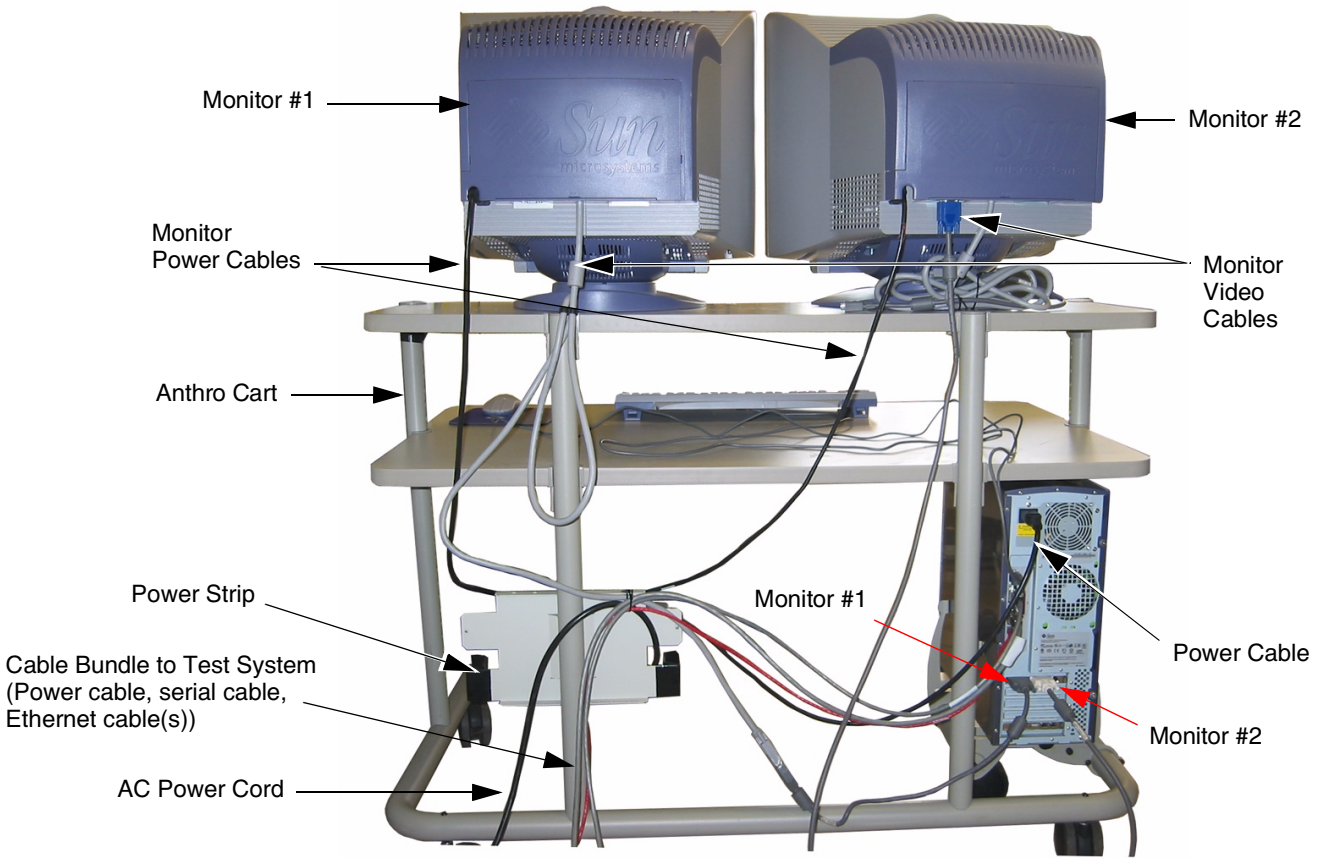
Sun Blade 1500 User Computer

The Catalyst test system may use a SUN Sun Blade 1500 (UltraSPARC IIIi) workstation (445-035-00) as its user computer. The Sun Blade computer uses a peripheral component interconnect (PCI) architecture with six slots. The figure Tiger Computer Subsystem Connections displays the particular connections associated with the Sun Blade user and tester computers.

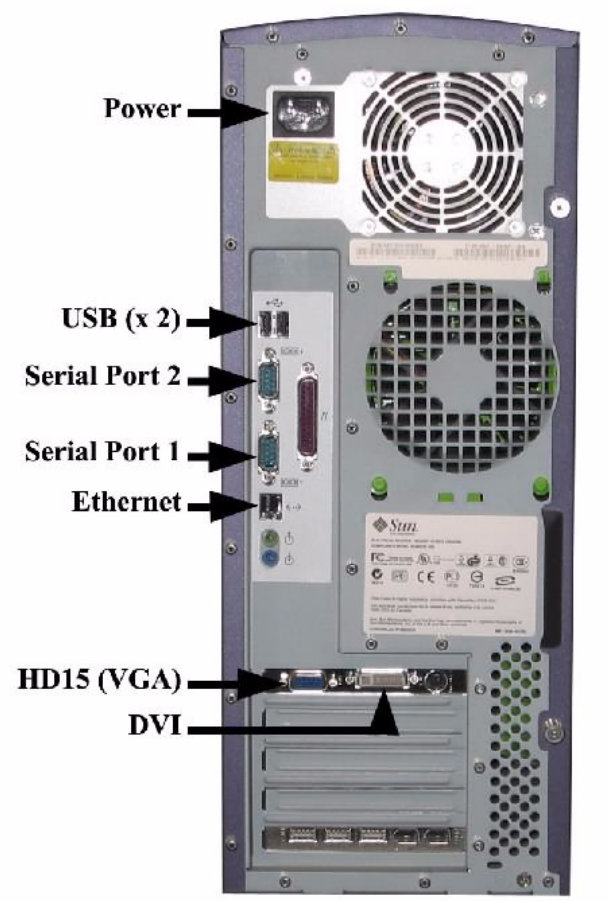


Tiger Computer Subsystem Connections

The Sun Blade user computer resides on an Anthro cart outside the system and connects to the support cabinet via a cable trunk. See the figure Sun Blade 1500 User Computer Peripherals.



Sun Blade 1500 User Computer Peripherals

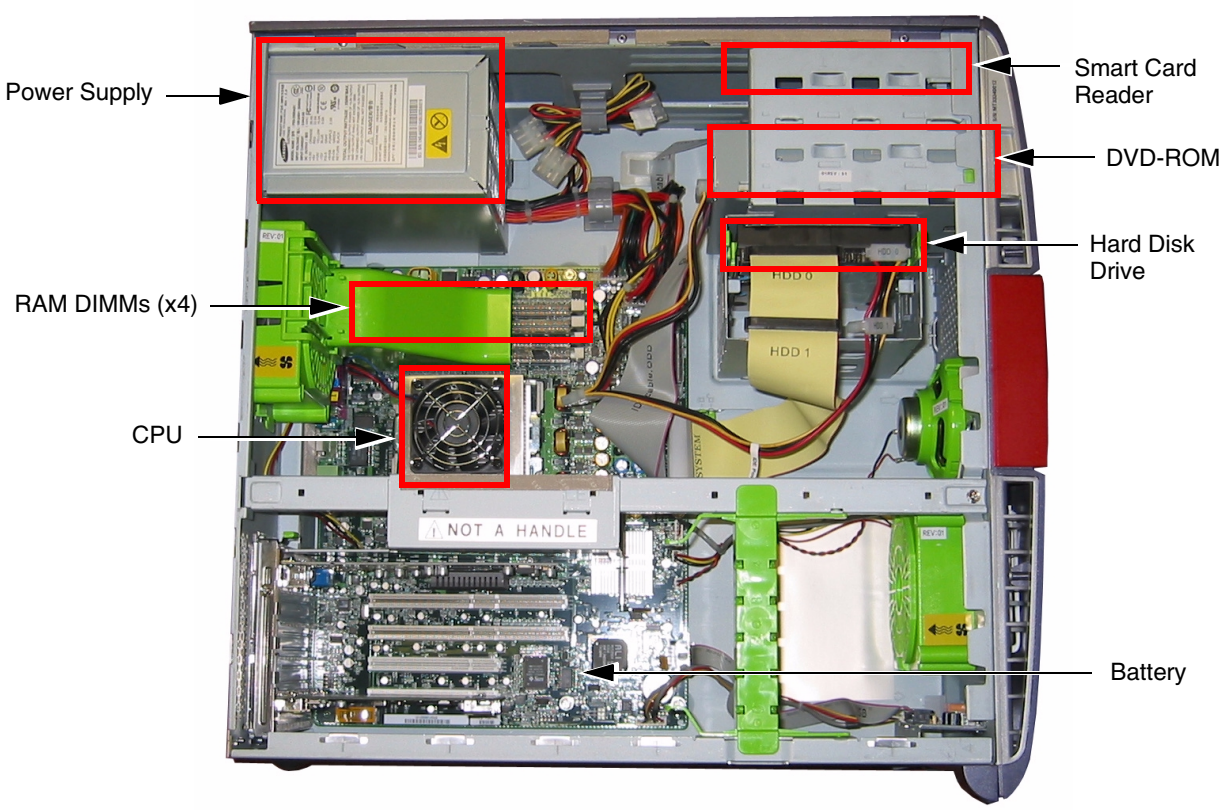


Sun Blade 1500 Workstation Front

Sun Blade Configuration

The Sun Blade 1500 workstation contains the following specifications. See the figure Sun Blade 1500 User Computer Internal Components.

- 1.06 GHz UltraSPARC IIIi (360-099-00)
- 1 GB RAM (four 256 MB DIMMs) (360-088-00)
- 80 GB IDE Hard Drive (360-092-00)
- 16X DVD-ROM (360-098-00)
- XVR-100 Graphics Card (360-095-00)



Sun Blade 1500 User Computer Internal Components

Overview

This chapter provides descriptions of the test computer equipment. There are two types of test computers available in a Catalyst system. An ELMA style or an Ultra series test computer. The following section describes the test computer system components and peripherals:

- ELMA Style Test Computer
- Ultra Series Test Computer
- Test Computer Boards
- Sun Blade Series Test Computer

For service information, see the sections Servicing the ELMA Test Computers, Servicing the Ultra 5, Ultra 10, and Ultra 60 Computer, and Servicing the Sun Blade 1500 and 2500 Computers.

ELMA Style Test Computer

The ELMA style test computer subsystem consists of the following:

- ELMA 9U VME Card Cage
- FORCE Computer CPU-24/VTF Board
- 949-634 BIF Board
- 879-700-03 TBA Board
- Terabus Terminator Board
- 10/100Base-T Ethernet Switching Hub
- GPIB-488 Board (optional)
- GPIB Bus Extender Option (optional)

ELMA 9U VME Card Cage

The ELMA test computer card cage is a six-slot 9U VME card cage with its own power supply and cooling fans. The card cage uses the power supply and fans, however there is a dc power outlet on the rear of the card cage. The card cage and all of its components and resident boards are powered by main power and remain powered even when test system power is off. Remember this when servicing the computer and its components.

The card cage is located in the upper left column of the mainframe, viewed from the service side (see the figure Test Computer Card Cage Location (Service Side)). The card cage holds the test computer, BIF board, Terabus board (AD700) and the optional GPIB-488 board (see the figureVME Card Cage).

The VME card cage has only two field replaceable units: the power supply (mounted to the rear access panel of the card cage) and the fan tray assembly (mounted underneath the card cage and accessible from the service side.)

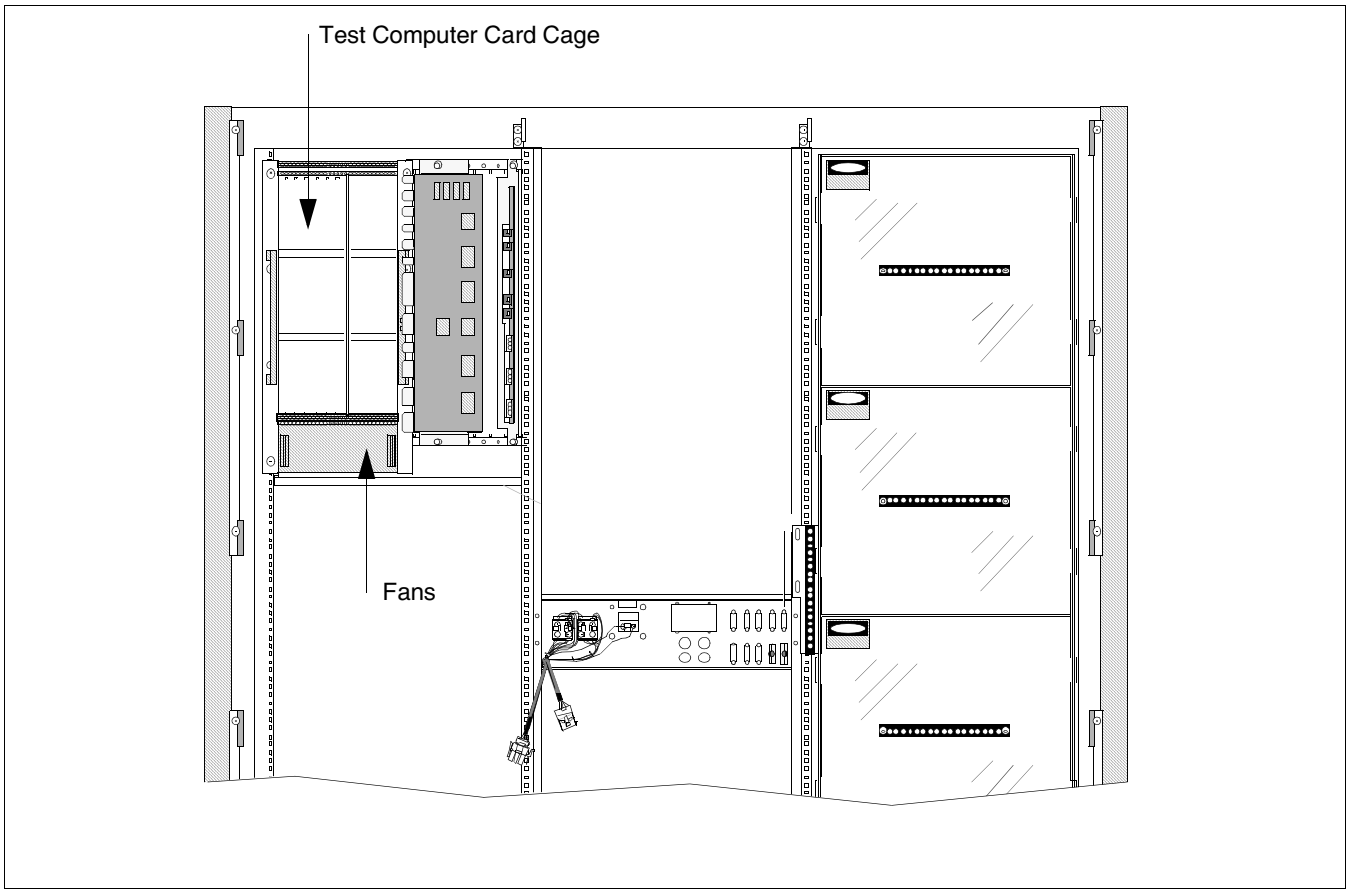
Note

The first Catalyst systems that shipped in 1997 and in early 1998 had a slightly different VME computer card cage than subsequent Catalysts. There is a difference in the DC power supply inside the cage and a difference in the wiring of the pull-out fan tray.

The newer style card cages can be easily distinguished from the older style by the ELMA model number sticker on the rear of the card cage. This sticker is visible from the operator side of the system with the linear power door opened.

The old style ELMA card cage model number: 12V-124224-R6J123-TE”3”

The new style ELMA card cage model number: 12V-124224-R6J123-TE”4”



Test Computer Card Cage Location (Service Side)

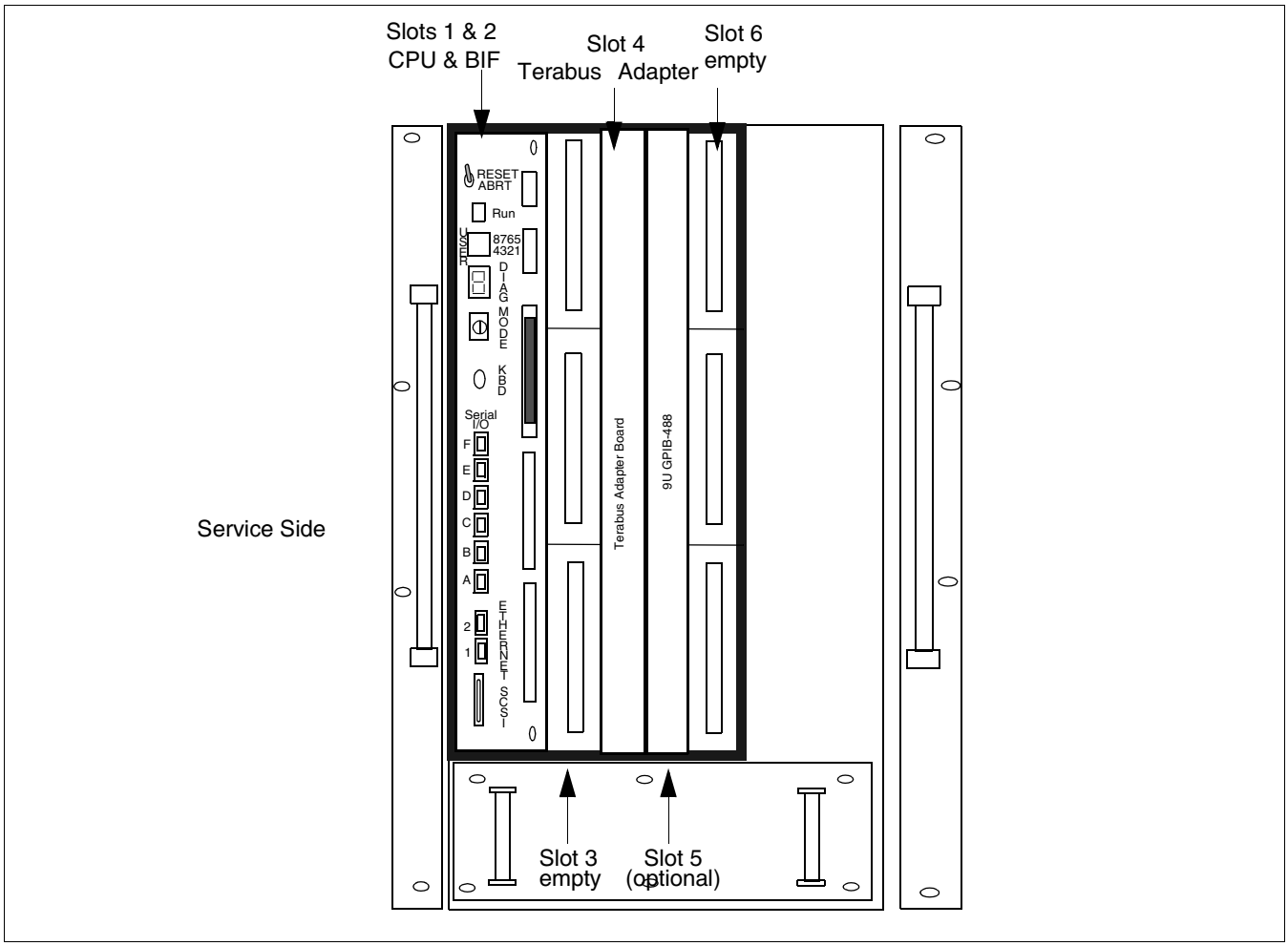
The VME card cage default slot configuration is listed in the table VME Default Configuration and shown in the figure VME Card Cage.

VME Default Configuration

Test Computer Board Description	Slot
CPU-24/VTF with attached LA634 BIF	1 & 2
Empty (used for CPU-24/VTF with four MBus processor modules, see Note below)	3
Terabus Adapter, AD700	4
GPIB-488/VME Interface (optional)	5
Empty	6

Note

The CPU-24/VTF occupies two VME bus slots, beginning with slot 1, but it requires three VME bus slots if there are four MBus processor modules installed.



VME Card Cage

Power Supply

The card cage assembly includes an auto-ranging 90-260VAC, 50-60Hz power supply. The power supply is field-replaceable. It is TUV, CSA, and UL certified.

The power supply provides the following voltages and currents for continuous operation:

- 55A minimum at +5VDC, +/- 2.5%
- 2A minimum at +12VDC, +/- 5%
- 1A minimum at -12VDC, +/- 5%

Voltages can be measured at the connector on the back of the card cage.

Cooling Fans

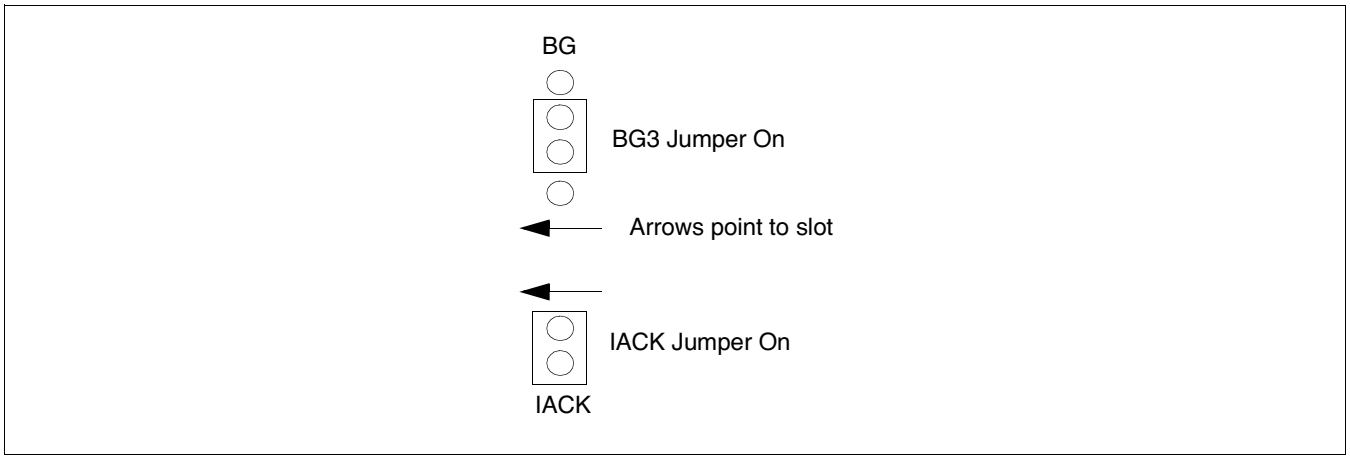
The card cage assembly contains cooling fans. The fans are located in a tray at the base of the test computer card cage (see the figure Test Computer Card Cage Location (Service Side)). The cooling fans are field-replaceable. Minimum airflow requirements are 2.3 linear meters per second (0.0046 cubic meters per second per board). Airflow circulates from the bottom to the top of the card cage.

Card Cage Backplane

The six slot backplane uses a standard VME bus for data distribution. The jumpers are located on the inside of the card cage in between the slots for the cards. The table Slot Descriptions and Jumper Settings lists the jumper settings for the VME backplane and the figure VME Jumper Locations shows the VME jumper locations.

Slot Descriptions and Jumper Settings

Slot #	Board Description	BG	IACK
1	CPU-24/VTF	No	No
2	CPU-24/VTF	Yes	Yes
3	Empty	Yes	Yes
4	AD700	No	No
5	GPIB-488 (optional)	Yes	No
	Empty	Yes	Yes
6	Empty	Yes	Yes



VME Jumper Locations

FORCE Computer CPU-24/VTF Board

The FORCE CPU-24/VTF is a VME bus-based board that uses a hyperSPARC processor with 64 MB of on-board DRAM memory. It is a 9U form factor card. Configurations for the board include: single processor, dual processors or two dual processors. The CPU-24/VTF (aside from the BIF board) is considered a single field replaceable unit. If the customer needs more memory or processor modules, the board is swapped out for one with the correct configuration already installed. See the figure CPU-24/VTF Board for the layout of the board and an illustration of the front panel.

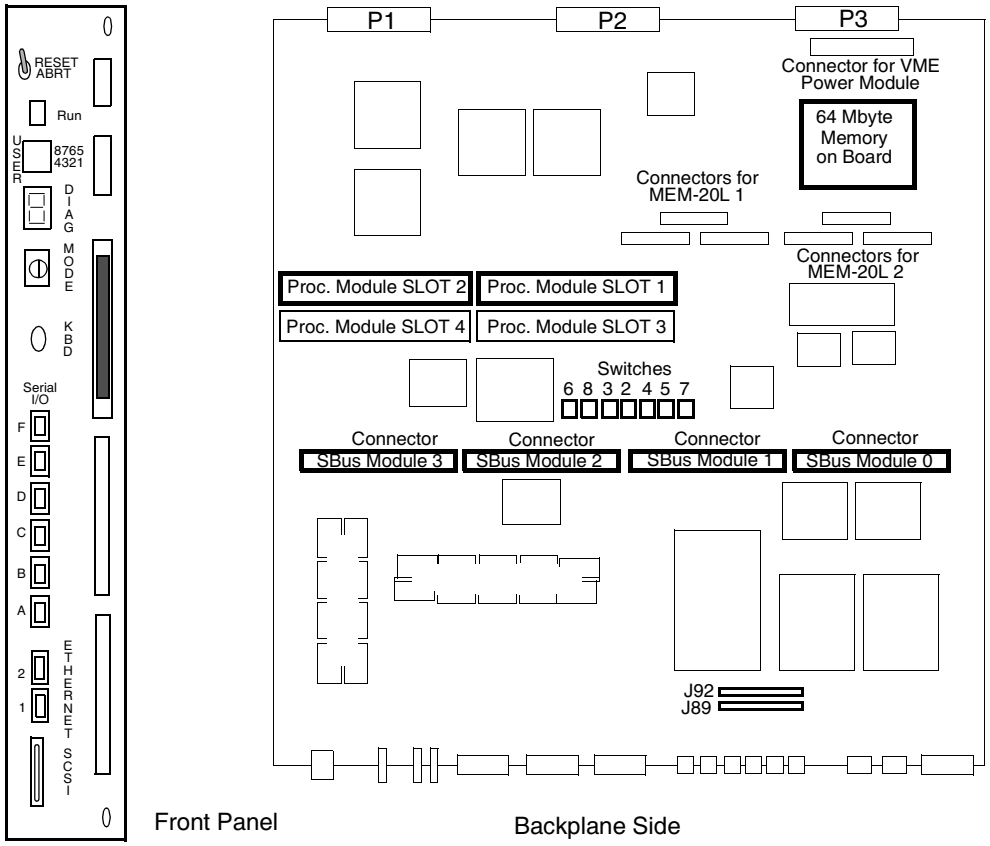
The board can be ordered in three different configurations depending on its use in the test system. The CPU-24/VTF (aside from the BIF board) is considered a single field replaceable unit.

Note

If the customer needs more memory or processor modules, the board is swapped out for one with the correct configuration already installed.

The configurations are:

- CPU-24/VTF-64, with 64 megabytes of memory installed and a single HyperSPARC Mbus module (150 megahertz)
- CPU-24/VTF-64, with 64 megabytes of memory installed and two HyperSPARC Mbus modules (150 megahertz)
- CPU-24/VTF-64, with 128 megabytes of memory installed and four HyperSPARC Mbus modules (150 megahertz) If the CPU-24/VTF has 128 megabytes, a rider board is inserted into one of the MEM-20L connectors.



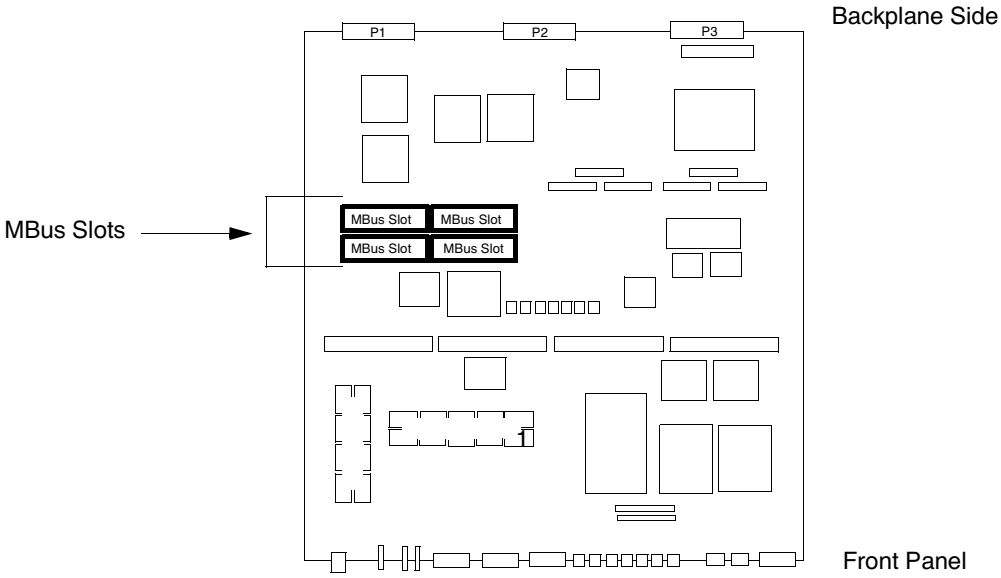
CPU-24/VTF Board

CPU-24/VTF Processor Module

The CPU-24/VTF processor module (MBus processor module) holds the processors, cache controllers, and external cache. Up to four MBus processor modules (one per CPU-24/VTF MBus slot) can be installed. At least one MBus module must be installed on the board. See the figure MBus Slots.

Note

Typically, the CPU-24/VTF occupies two VME slots (slots 1 and 2) in the test computer card cage. However, if there are two dual MBus processor modules installed, three VME slots are required (slots 1, 2, and 3).

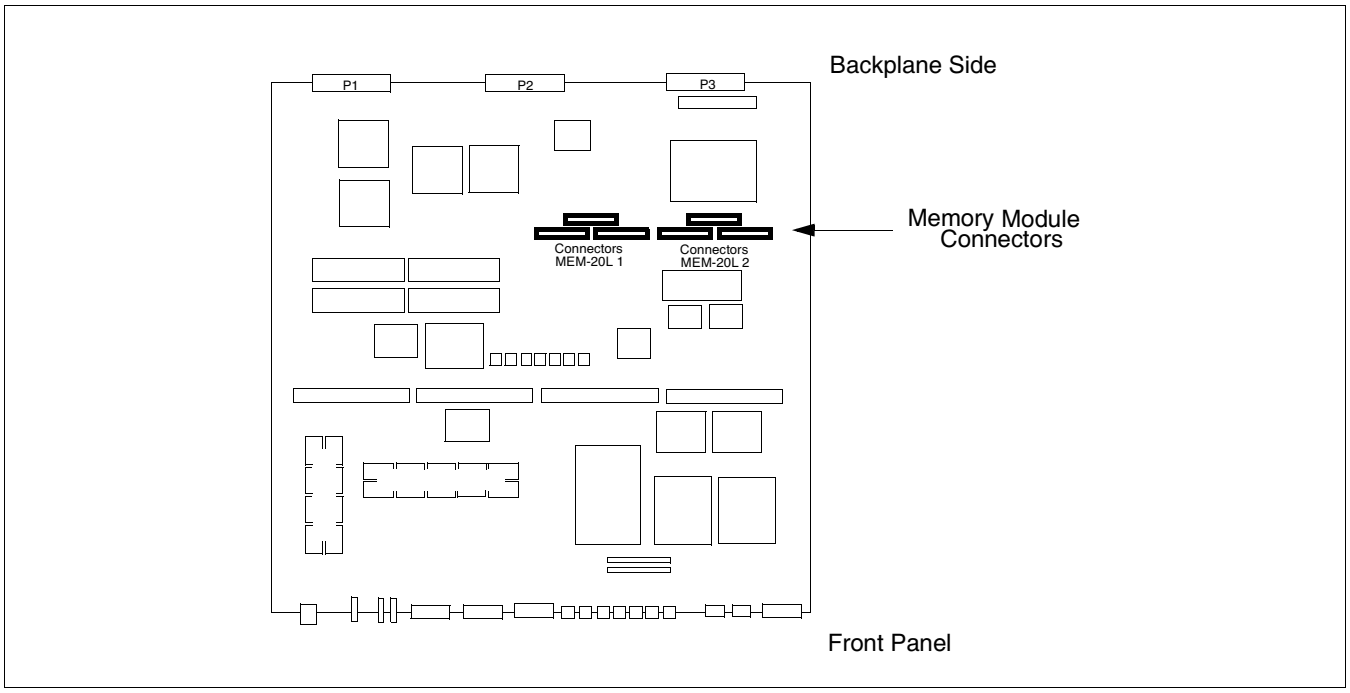


MBus Slots

CPU-24/VTF Memory Module

Memory modules for the CPU-24/VTF plug into the memory module connectors on the CPU-24/VTF. Either 64 MB or 128 MB (max) of DRAM memory may reside on each memory module. See the figure Memory Module Connectors.

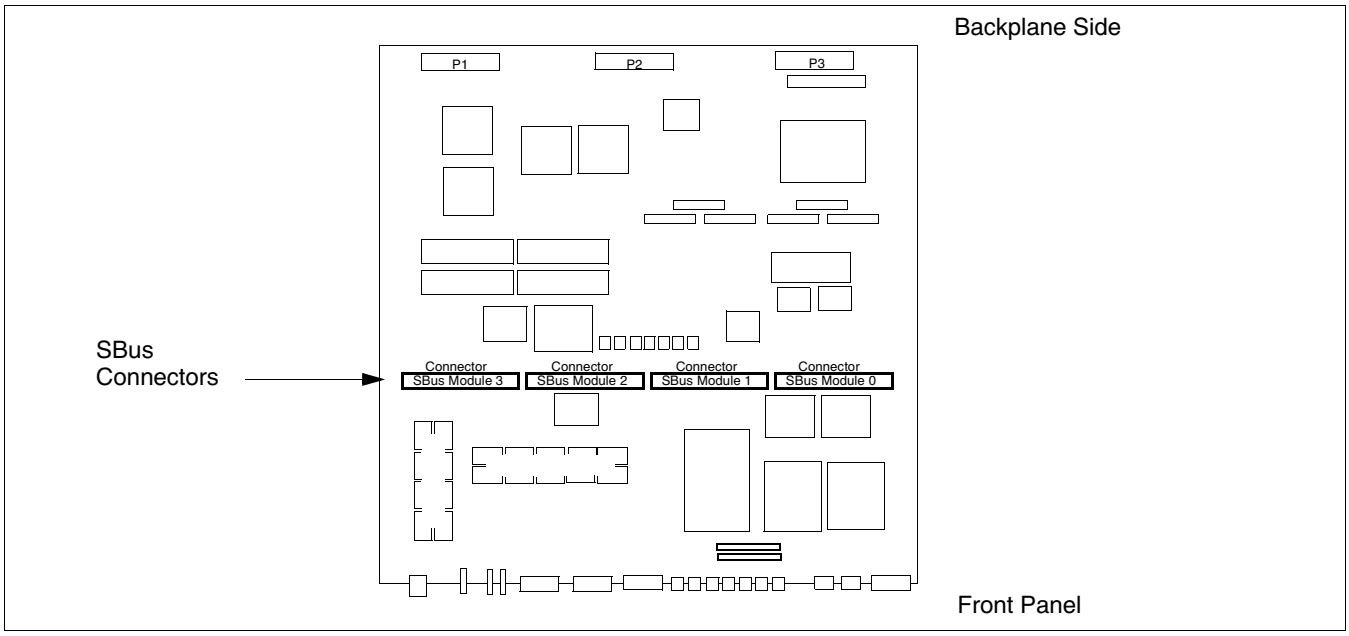
Memory modules can be “stacked.” That is, memory modules can either be plugged directly into connectors on the CPU-24/VTF or can be piggy-backed into connectors on the back of previously installed memory modules. To increase memory, swap the boards.



Memory Module Connectors

CPU-24/VTF SBus Slots

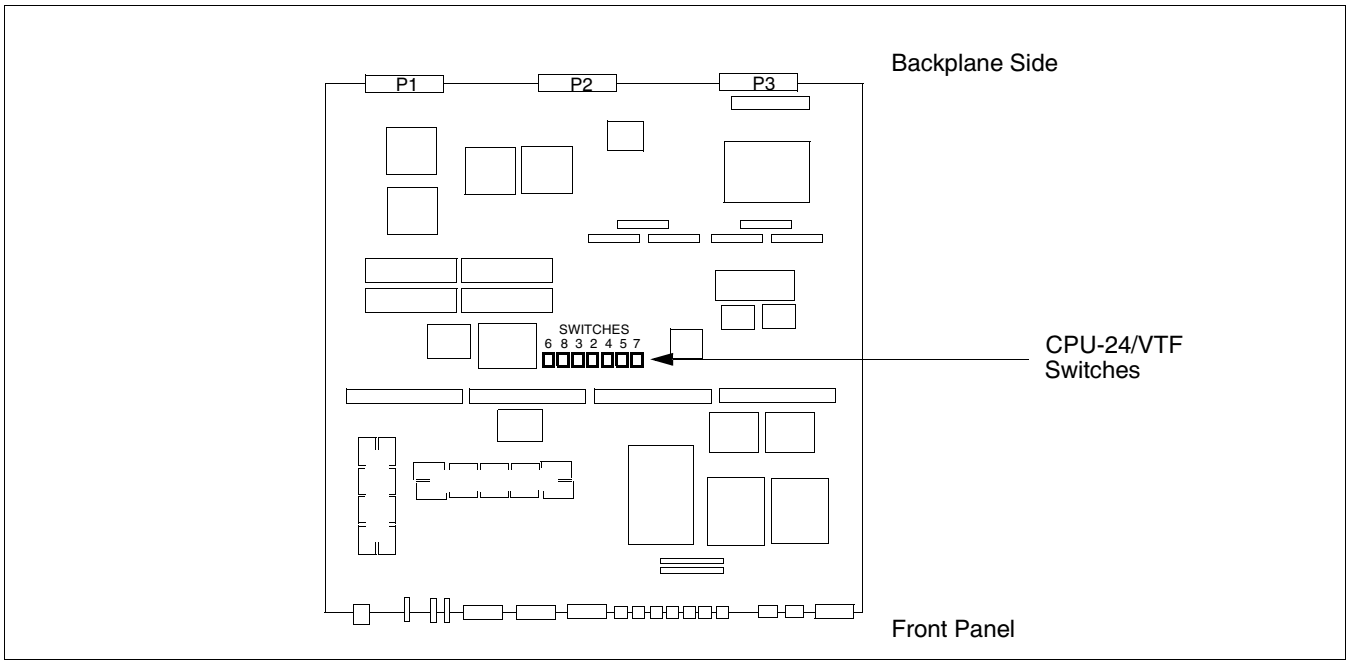
The CPU-24/VTF has space for up to four SBus modules (see the figure SBus Connectors).



SBus Connectors

CPU-24/VTF Switches

The figure Switches shows the location of the CPU-24/VTF's switches.



Switches

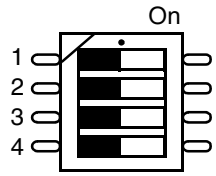
Default Switch Settings

Teradyne's default switch settings are as follows: SW1 - SW7 are all switched off.

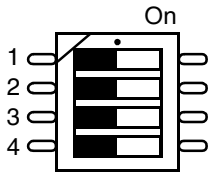
SW8-4 is turned on. SW8-4 on differs from the FORCE's default of off.

The tables Default Switch Settings, SW2-1 - SW2-4 through Default Switch Settings, SW8-1 - SW8-4 provide the default switch settings that are used by the FORCE computer. This information is provided for your reference.

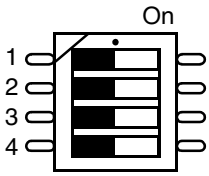
Default Switch Settings, SW2-1 - SW2-4

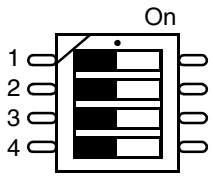
<table>
<tr><th colspan="2">Name and Default Setting</th><th colspan="3">Description</th></tr>
<tr><td rowspan="11"> 
</td><td>SW2-1
off</td><td colspan="3">Reserved - must be off</td></tr>
<tr><td>SW2-2
off</td><td colspan="3">D-sub serial I/O configuration: Serial
B or H - signals for second serial I/O port of D-Sub front panel connector. The configuration depends on the following:
• SW8-4 defines the two serial I/O ports available on the front panel D-Sub connector.
• SW3-2 and SW3-3 setting.
• The hybrid installed in location J89: FH-002 for RS-232 support or FH-003 for RS-422 support.
The default status is all switches off.</td></tr>
<tr><td rowspan="10">SW2-3
off</td><td colspan="3">FH-002 assembled:</td></tr>
<tr><td>Switch settings</td><td colspan="2">Configuration</td></tr>
<tr><td>3-2</td><td>3-3</td><td rowspan="2"></td></tr>
<tr><td>off</td><td>off</td><td>RS-232</td></tr>
<tr><td colspan="3">FH-003 assembled:</td></tr>
<tr><td>Switch settings</td><td colspan="2">Configuration</td></tr>
<tr><td>3-2</td><td>3-3</td><td rowspan="2"></td></tr>
<tr><td>off</td><td>off</td><td>RS-422: CTS+/- and RTS+/- available on conn.</td></tr>
<tr><td>on</td><td>off</td><td>RS-422: RTxC+/- and RTS+/- available on conn.</td></tr>
<tr><td>off</td><td>on</td><td>RS-422: CTS+/- and TRxC+/- available on conn.</td></tr>
<tr><td>on</td><td>on</td><td>RS-422: RTxC+/- and TRxC+/- available on conn.</td></tr>
<tr><td>SW2-4
off</td><td colspan="3">Reserved: must be off</td></tr>
</table>

Default Switch Settings, SW3-1 - SW3-4

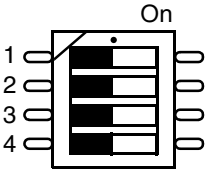
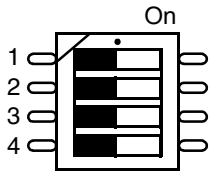
Name and Default Setting		Description		
	SW3-1 off	Reserved - must be off		
	SW3-2 off SW3-3 off	D-sub serial I/O configuration: Serial A or G - signals for first serial I/O port of D-Sub front panel connector. The configuration depends on the following: • SW8-4 defines the two serial I/O ports available on the front panel D-Sub connector. • SW2-2 and SW2-3 setting. • The hybrid installed in location J92: FH-002 for RS-232 support or FH-003 for RS-422 support The default status is all switches off.		
		FH-002 assembled:		
		Switch settings		Configuration
		3-2	3-3	
		off	off	RS-232
		FH-003 assembled:		
		Switch settings		Configuration
		3-2	3-3	
		off	off	RS-422: CTS+/- and RTS+/- available on conn.
		on	off	RS-422: RTxC+/- and RTS+/- available on conn.
		off	on	RS-422: CTS+/- and TRxC+/- available on conn.
		on	on	RS-422: RTxC+/- and TRxC+/- available on conn.
	SW3-4 off	Reserved: must be off		

Default Switch Settings, SW4-1 - SW5-4

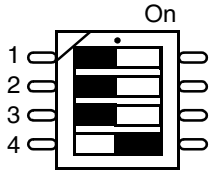
Name and Default Setting		Description
	SW4-1 off	SCSI-termination for the lower 8 bit of P2 SCSI 2 off = enabled on = disabled
	SW4-2 off	SCSI-termination for the upper 8 bit of P2 SCSI 2, only available with the FEPS factory option. off = enabled on = disabled
	SW4-3 off	SCSI-termination for front panel SCSI 1 off = enabled on = disabled
	SW4-4 off	Reserved: must be off

Name and Default Setting		Description
	SW5-1 off	Reset function of Reset/Abort key off = enabled on = disabled
	SW5-2 off	Abort function of Reset/Abort key off = enabled on = disabled
	SW5-3 off	VMEbus SYSRESET output off = enabled, i.e., on-board SYSRESET is driven to VMEbus on = disabled
	SW5-4 off	Reserved: must be off

Default Switch Settings, SW6-1 - SW7-4

Name and Default Setting		Description
	SW6-1 off	Local LCA configuration mode: for FORCE computers internal use only. Must be off.
	SW6-2 off	S2S Bridge LCA configuration mode: for FORCE computers internal use only. Must be off.
	SW6-3 off	VME64 EXT LCA configuration mode: for FORCE computers internal use only. Must be off.
	SW6-4 off	Reserved: must be off
	SW7-1 off	VMEbus slot 1 auto-detection off = enabled on = disabled (also called manual mode, see SW7-2)
	SW7-2 off	VMEbus slot 1 manual mode (only available when SW1-7 = on) off = disabled on = enabled
	SW7-3 off	Reserved: must be off
	SW7-4 off	Reserved: must be off

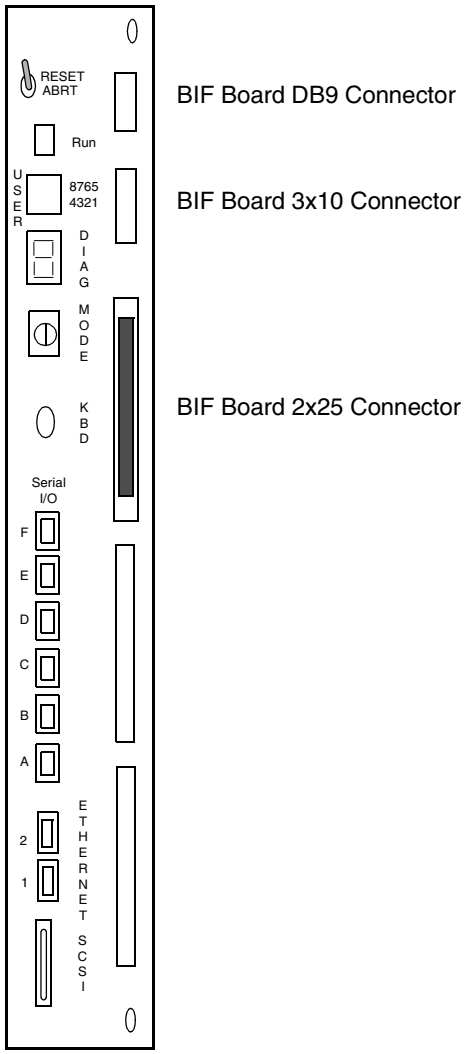
Default Switch Settings, SW8-1 - SW8-4

Name and Default Setting		Description
	SW8-1 off	Boot PROM write protection off = write-protected on = write-enabled
	SW8-2 off	User flash write protection off = write-protected on = write-enabled
	SW8-3 off	VMEbus SYSRESET input off = enabled, i.e. VMEbus reset is driven to on-board reset on = disabled
	SW8-4 on	Front-panel serial I/O port configuration. off = A+B on D-Sub, if assembled, and C - H on RJ-45 on = G+H on D-Sub, if assembled, and A - F on RJ-45

CPU-24/VTF Front Panel

There is one CPU-24/VTF front panel style currently in use. See the figure CPU-24/VTF Front Panels and the table Front Panel Features for a full list of the features. The connectors include:

- Three D-sub connectors for the BIF board (if the board is present)
- Six serial I/O connectors - 8-pin twisted-pair (RJ-45) connector
- Ethernet 1 connector - 8-pin twisted-pair (RJ-45) connector, used for 10Base-T connection
- Ethernet 2 connector - 8-pin twisted-pair (RJ-45) connector, used for 100Base-T connection
- SCSI connector (not used)
- Keyboard/mouse connector (not used)



CPU-24/VTF Front Panels

Front Panel Features

Device	Description
RESET/ABORT	Mechanical three state reset/abort key with middle off position: When enabled and toggled upwards, the reset/abort generates a reset for the CPU-24/VTF board. If SW5-3 = off, the reset generates a VME bus SYSRESET. Reset of all on-board I/O devices and the CPU when the reset key is pushed to the UP position. RESET is held active until the key is in and returned to the middle off position, but at least 200ms is guaranteed by a local timer. Power fail (below approximately 4.7V) and power up, both lasting at a minimum of 200ms to 300ms, also force a reset to start the CPU board. When enabled and toggled downwards, the reset/abort generates a non-maskable interrupt request to the processor. This allows the user to implement an abort of the current program, to trigger a self-test or to start a maintenance program.
RUN	CPU status: green: (normal operation) red: (the processor is halted or reset is active)
BM	VME busmaster and SYSFAIL LED green: (if the CPU board accesses the VME bus as VME bus master.) red: (if SYSFAIL is asserted from the FGA-5000) off: (otherwise)
USER 1-8	Eight user LEDs: Software programmable within the EBus address range. Possible status: yellow or off. (Not used by Teradyne)
DIAG	Software programmable hexadecimal display for diagnostics. It can be accessed via the EBus. (Not used by Teradyne)
MODE	Hexadecimal rotary switch, decoded with 4 bit. The status of the rotary switch can be read from the EBus. default setting: F16 (Not used by Teradyne)
KBD	Standard 8-pin mini DIN connector for keyboard and mouse (Not used by Teradyne)
SERIAL A-F	Six 8-pin shielded RJ-45 connectors for serial interfaces.
ETHERNET 1 & 2	Two standard shielded 8-pin Ethernet connectors, both for twisted-pair Ethernet. ETHERNET 2 provides the 100Base-T Ethernet signals. ETHERNET 1 provides 10Base-T ethernet signals.
SCSI 1	Standard SCSI 50-pin fine pitch connector. (Not used by Teradyne)

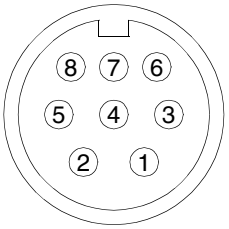
CPU-24/VTF Connectors

Connector Location	Connector Function	Connector Type
Front Panel	Keyboard/Mouse	8-pin mini DIN
	Serial I/O	8-pin RJ-45
	Serial I/O	25-pin D-Sub
	Ethernet 1	8-pin RJ-45
	Ethernet 2	
	SCSI	50-pin fine pitch

Connector Location	Connector Function	Connector Type
P17	SBus Module 0	96-pin SMD
P18	SBus Module 1	
P19	SBus Module 2	
P20	SBus Module 3	
P1	VME Bus P1	96-pin VG
P2	VME Bus P2	
P3	VME Bus P3	

Keyboard/Mouse Port

The keyboard and mouse port is available on the front panel via an 8-pin mini Din connector. See the figure Keyboard/Mouse Connector Pinout.



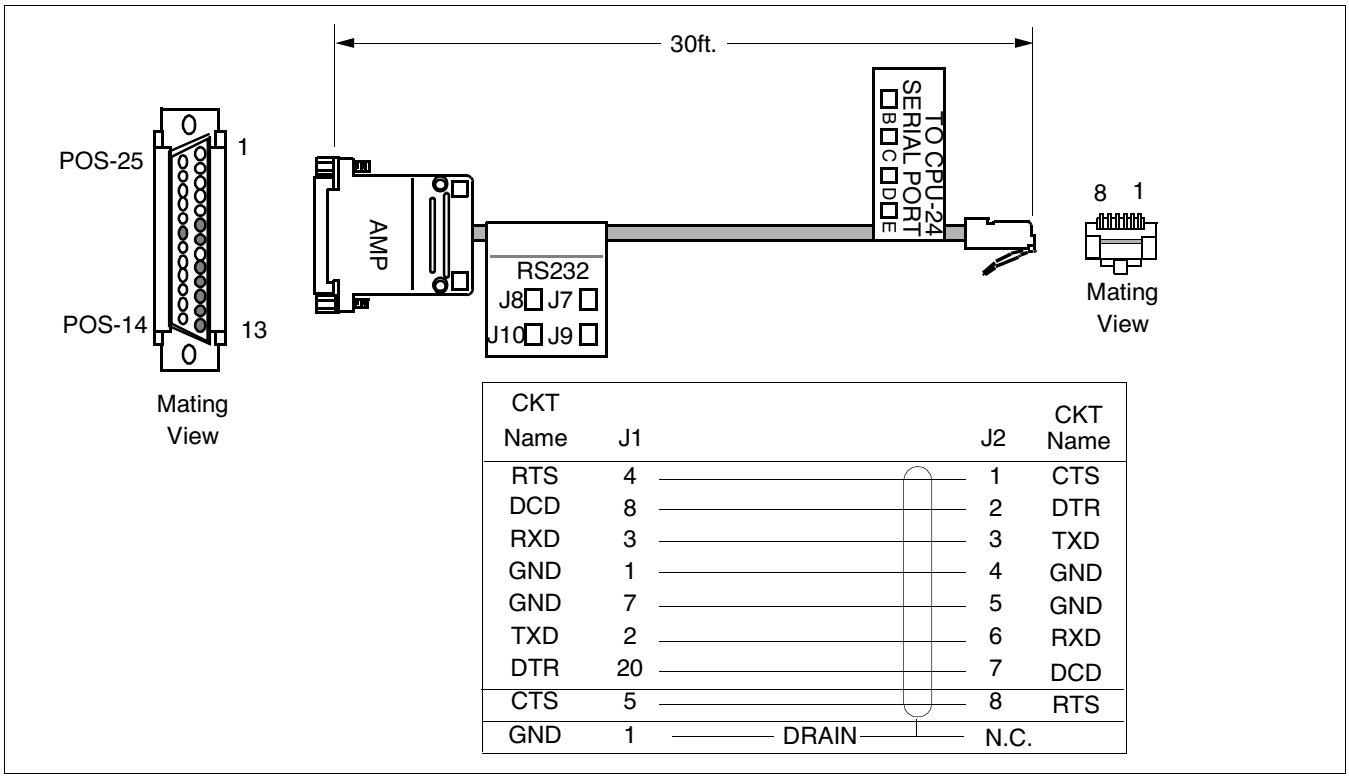
Pin	Function
1	GND
2	GND
3	+5VDC
4	MOUSEIN, Mouse in
5	KBDOUT, Keyboard out
6	KBDIN, Keyboard in
7	MOUSEOUT/POWER on (Mouse out or power on)
8	+5VDC

Keyboard/Mouse Connector Pinout

Serial Interface Connectors

The serial interface for handlers and probers is provided by the serial interface on the CPU-24/VTF board. Cable pn 804-316-00 connects to the CPU-24/VTF at connector (B) and is routed to the bulkhead for connection to the external probers and handlers.

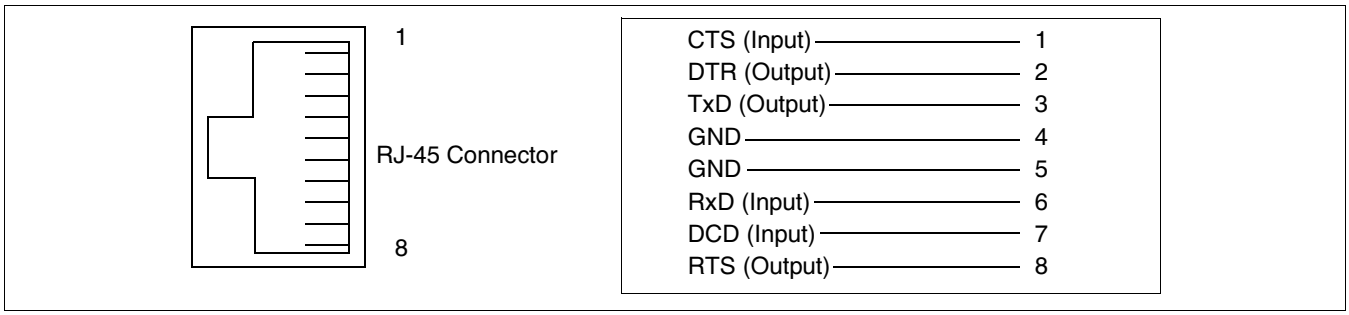
Serial interface for optional handlers and probers can be accommodated by purchasing additional serial interface cables and connecting them to the serial connectors (C-E). See the figure VME Card Cage and the figure Serial Port B To Bulkhead Serial Connector Cable (pn 804-316-00).



Serial Port B To Bulkhead Serial Connector Cable (pn 804-316-00)

Serial I/O Port Connector Pinout

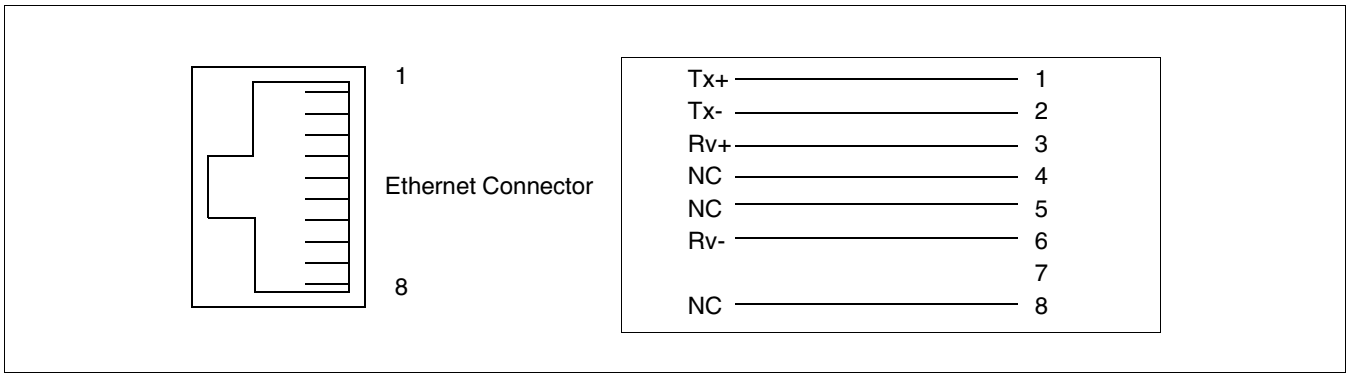
The CPU-24/VTF provides six RJ-45 serial I/O ports on the front panel. The connector pinout is shown in the figure Serial I/O Front Panel RJ-45 Connector Pinout.



Serial I/O Front Panel RJ-45 Connector Pinout

Ethernet

The CPU-24/VTF board provides an Ethernet port on the front panel. The connector pinout is shown in the figure Ethernet Front Panel Connector Pinout.



Ethernet Front Panel Connector Pinout

SBus

The SBus is a 64-bit high speed data bus local to the CPU-24 board only. It allows high speed communication between CPU and high speed peripherals such as the BIF, graphics and ethernet boards.

SCSI 1

The SCSI 1 is a standard SCSI port intended to connect external storage devices. This port is not used by Teradyne.

VME Bus

The VME bus is totally contained within the VME backplane. It is the databus that allows low-level communication between the various cards in the computer card cage. The CPU-24/VTF, Terabus Adapter Board and 9U-GPIB-48 access the bus through the P1, P2, and P3 connectors.

Ultra Series Test Computer

There are two types of Ultra test computer currently in use:

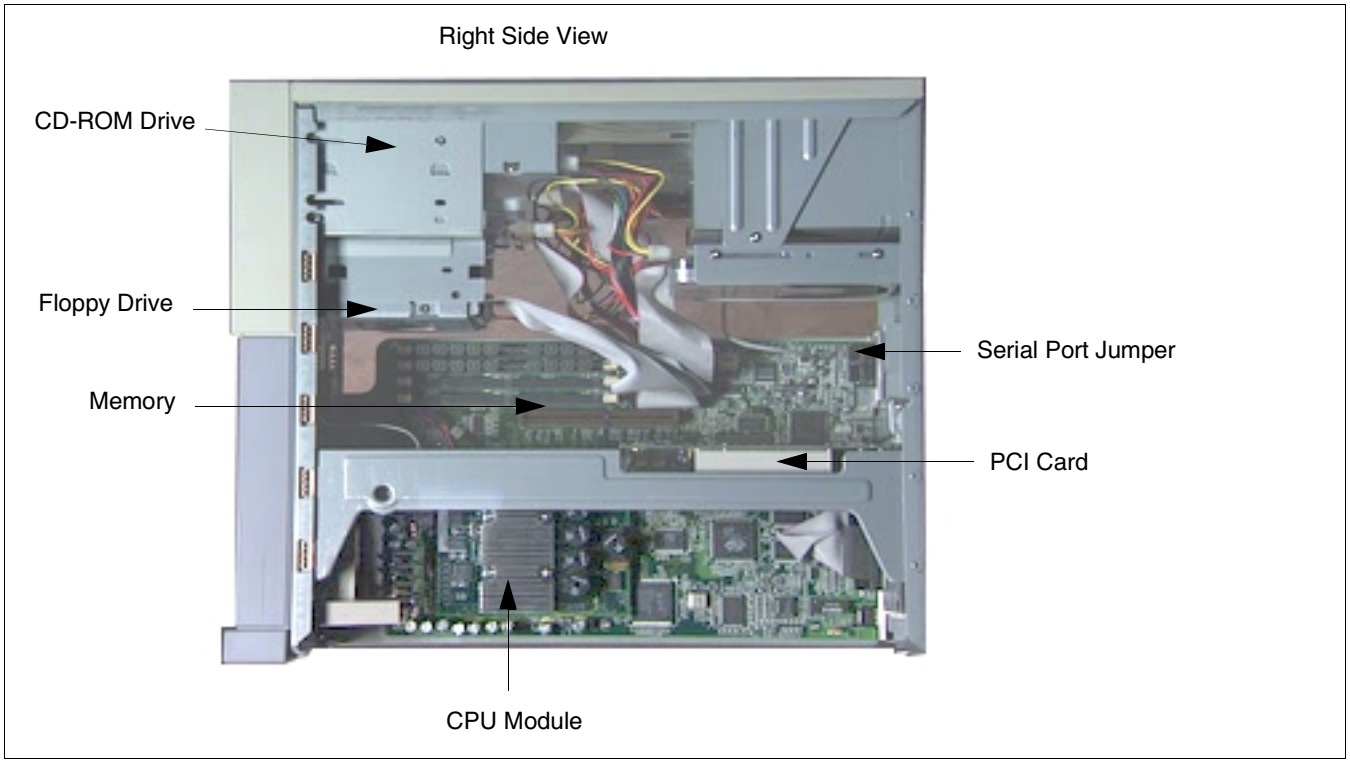
- Sun Ultra 10
- Sun Ultra 60

The Ultra series test computer subsystem contains the following options and peripherals:

- Sun Ultra 10 or Sun Ultra 60 test computer
- PCI BIF Board
- PCI TBA Board
- Terabus Terminator Board
- PCI GPIB Board
- GPIB Bus Extender Option (optional)
- PCI RS232 Serial Expansion Board (optional)
- 10/100Base-T Ethernet Switching Hub

Sun Ultra 10

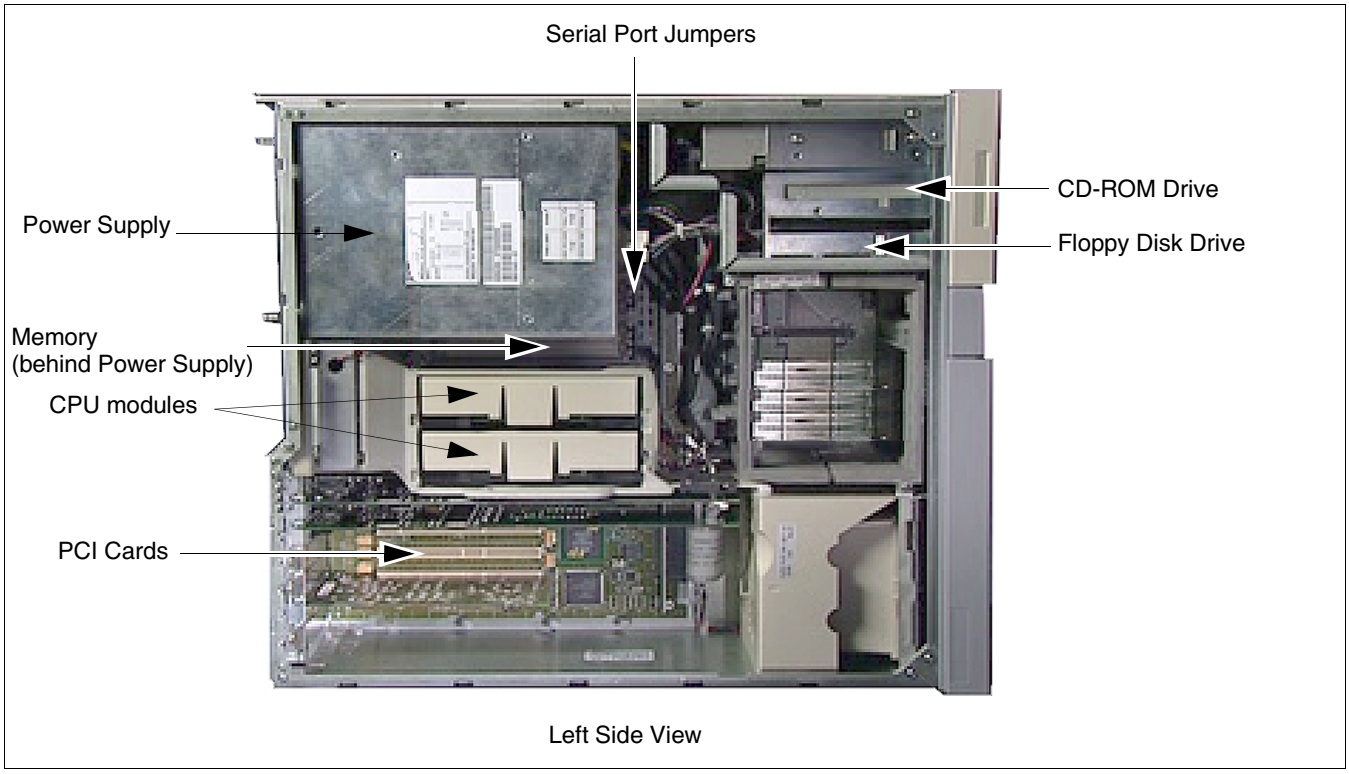
The Sun Ultra 10 workstation has a 440 MHz UltraSPARC IIi, a 1.44 Mbyte floppy drive and 256 Mbyte DRAM. The 440 Model supports four 32-bit 33 MHz PCI busses and 10/100Base-T Ethernet connections. See the figure Ultra 10 Internal Components.



Ultra 10 Internal Components

Sun Ultra 60

The Sun Ultra 60 workstation contains two 450 MHz UltraSPARC-II CPU Modules. The UltraSPARC-II CPU module is a 450 MHz processor with 4.0 MBytes of external cache memory. The 450 Model supports four 32-bit 33 MHz PCI busses, 10/100Base-T Ethernet connections and has 256 MByte RAM. See the figure Ultra 60 Internal Components.



Ultra 60 Internal Components

Ultra Series Specifications

The technical specifications for the Ultra 10 test computer is listed in the table Ultra 10 Specifications.

Ultra 10 Specifications

Description	Ultra 10 Engineering Configuration
Processor	440 MHz UltraSPARC IIi CPU Module
RAM	256 Mbyte DRAM (2 slots DSIMMS 2X128)
Graphics	PGX24 24-bit frame buffer
Bus	4 32-bit 33 MHz PCI busses
Network	10/100-Base-T Ethernet (auto sensing)
Slots	4 33 MHz PCI Slots
Floppy	1.44 Mbyte internal floppy drive
CD-ROM	32X Internal Drive

Ultra 60 Specifications

Description	Ultra 60 Configuration
Processor	2 450 MHz UltraSPARC II CPU Module with 4 Mbyte of e-cache
RAM	256 Mbyte SRAM (2 slots DSIMMS 2 X128)
Graphics	PGX24 24-bit frame buffer
Bus	4 32-bit 33 MHz PCI busses
Network	10/100-Base-T Ethernet (auto sensing)
Slots	4 33 MHz PCI Slots
Floppy	1.44 Mbyte internal floppy drive
CD-ROM	32X Internal Drive

Processor

The Sun Ultra 10 has a 440MHz UltraSPARC IIi CPU Module. The UltraSPARC IIi CPU is a system on a chip that combines the SPARC microprocessor with 2 Mbyte internal cache.

The Sun Ultra 60 has two 450MHz UltraSPARC-II CPU Modules. Each UltraSPARC II CPU is a system on a chip that combines the SPARC microprocessor with 2 Mbyte internal cache.

RAM

The Ultra Series test computers ship with 256 Mbyte of DRAM (two 128 Mbyte DIMMS (pn 425-435-02 for the Ultra 5 or 10 and pn 425-473-00 for the Ultra 60)).

PCI Bus

Both the Ultra 10 and Ultra 60 computers utilize a standard PCI bus architecture. The PCI bus interconnects boards such as the Terabus Adaptor (TBA) board, the Bus Interface (BIF) board, the GPIB board, or the RS232 serial port expansion interface to the main computer. These PCI devices plug into designated PCI slots where their connectors protrude out of the back of the computer for interconnection purposes.

The Ultra series test computer has 4 PCI slots. The PCI bus is a 32-bit 33 MHz bus. PCI slots are superheated into long and short categories. The long and short refer to the size PCI board that can physically be installed into the machine.

Ultra 10 Connectors

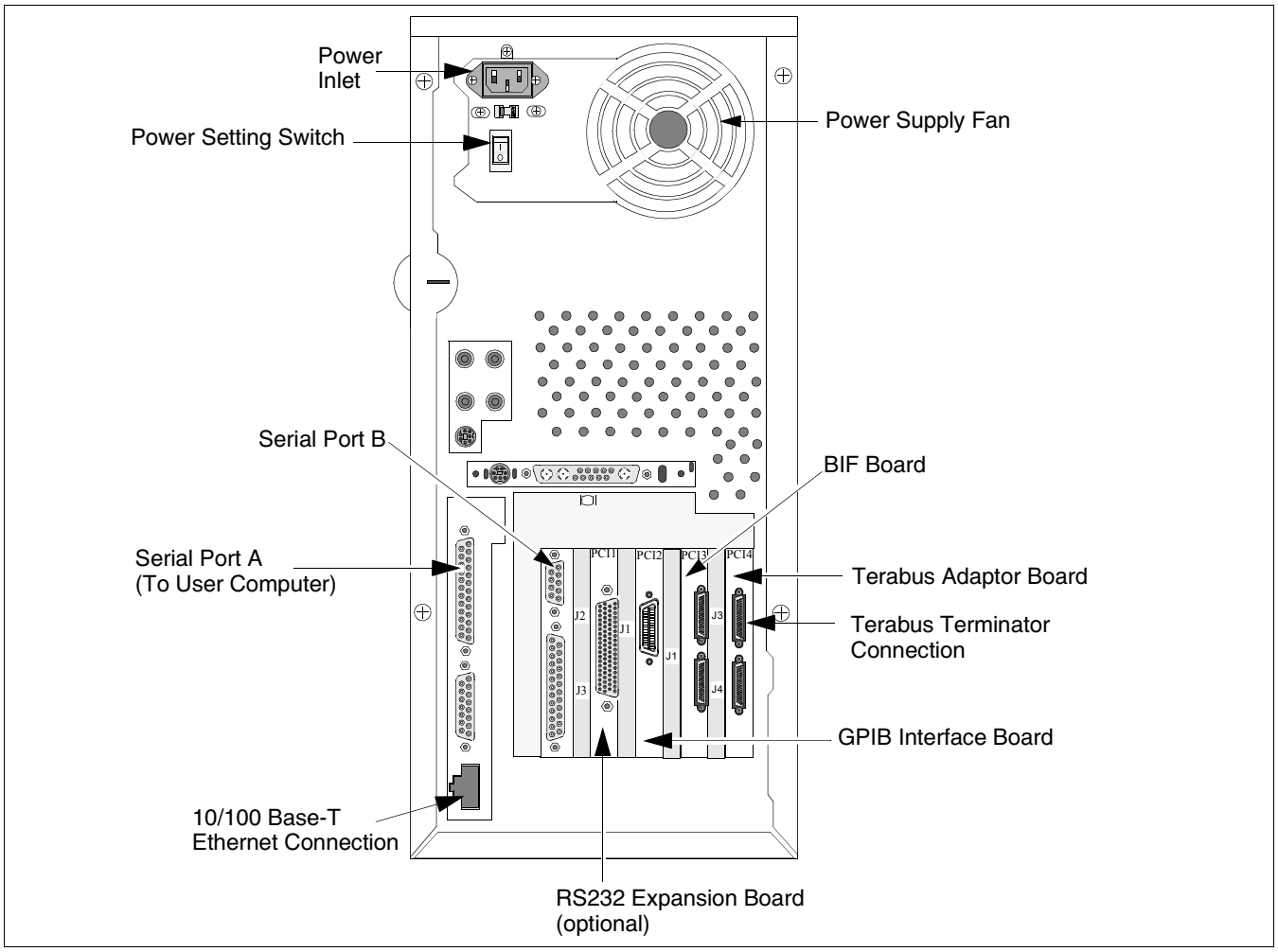
The following connectors are located on the rear panel of the Ultra 10 series workstation (see the figure Ultra 10 Rear View):

! Caution

All Catalyst Computers must be set to the 230V position.

- Power inlet
- Ethernet connector
- Monitor connector
- Test computer cable

Computer configurations can vary. Not all connectors listed above or shown in the figure Ultra 10 Rear View may be present.



Ultra 10 Rear View

Ultra 60 Connectors

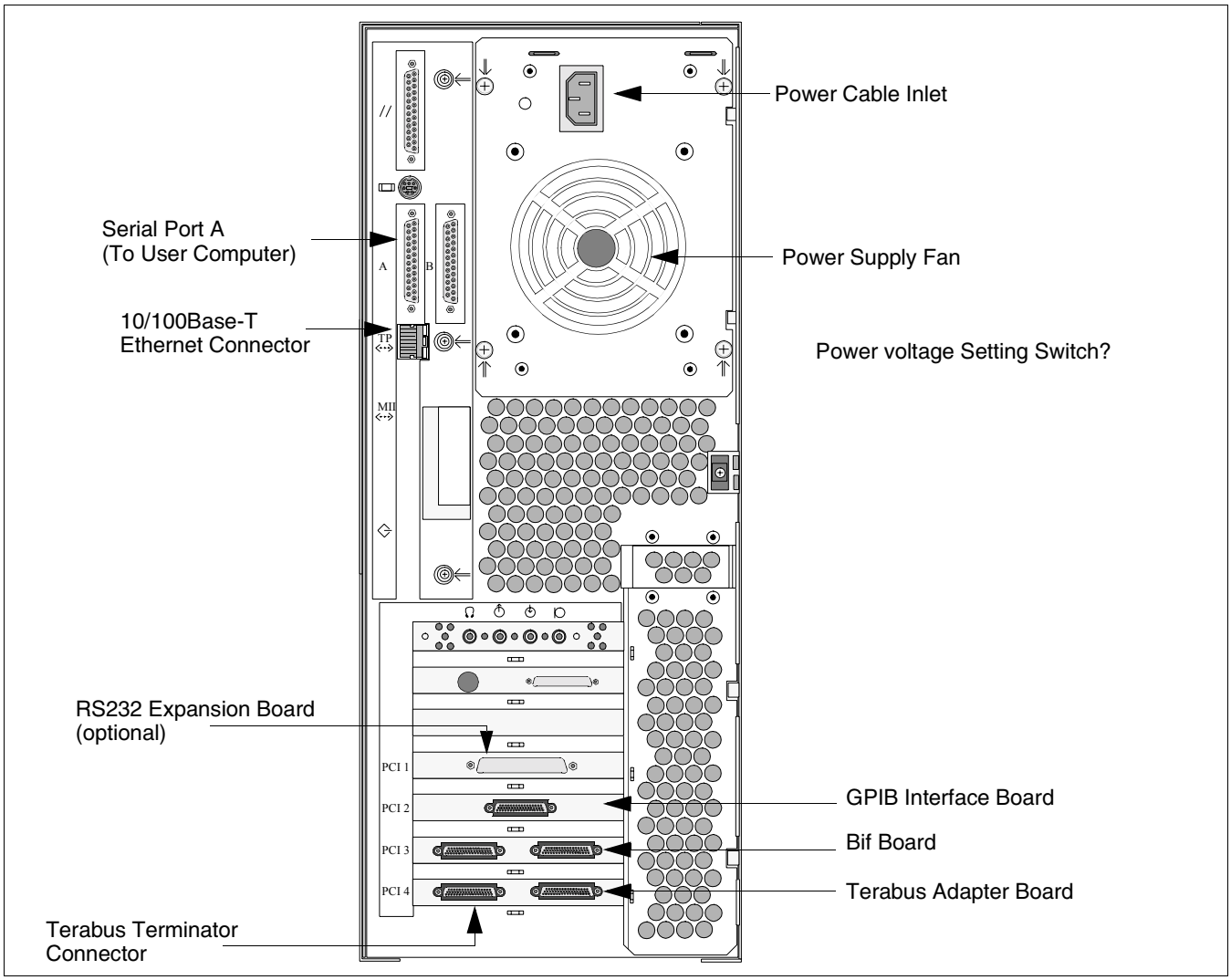
The following connectors are located on the rear panel of the Ultra 60 series workstation (see the figure Ultra 60 Rear View):

! Caution

All Catalyst Computers must be set to the 230V position.

- Power inlet
- Ethernet connector
- Monitor connector
- Test computer cable

Computer configurations can vary. Not all connectors listed above or shown in the figure Ultra 60 Rear View may be present.



Ultra 60 Rear View

Test Computer Boards

The Catalyst test system uses four primary types of interface boards:

- Bus Interface (BIF) Board
- Terabus Adapter (TBA) Board
- General Purpose Interface Bus (GPIB) Board
- PCI RS232 Serial Expansion Board (optional)

Boards in the ELMA style test computer are Sbus boards, which plug directly into the VME card cage backplane and are supported by SBus technology. See the section SBus for more information.

The PCI board versions of these boards fit into designated PCI slots on Ultra 10 test computer. See the table PCI Board Locations and the figure Ultra 10 Rear View for more information.

PCI Board Locations

Slot No.	Board Name and Part Number
1	RS232 Serial Port Expansion Board (pn 425-462-00)
2	PCI GPIB Interface Board (pn 425-432-00)
3	PCI BIF Board (pn 949-823-01)
4	PCI TBA Board (pn 949-824-02)

Bus Interface (BIF) Board

The BIF board allows high speed data and control function transfers between the test computer and the digital and PACS subsystems. The BIF creates the TCIO busses. The BIF board can be swapped without any system administrator changes. The BIF is connected to the test computer through two SBus connectors. The card receives power from the test computer through the SBus connectors.

949-634 BIF Board

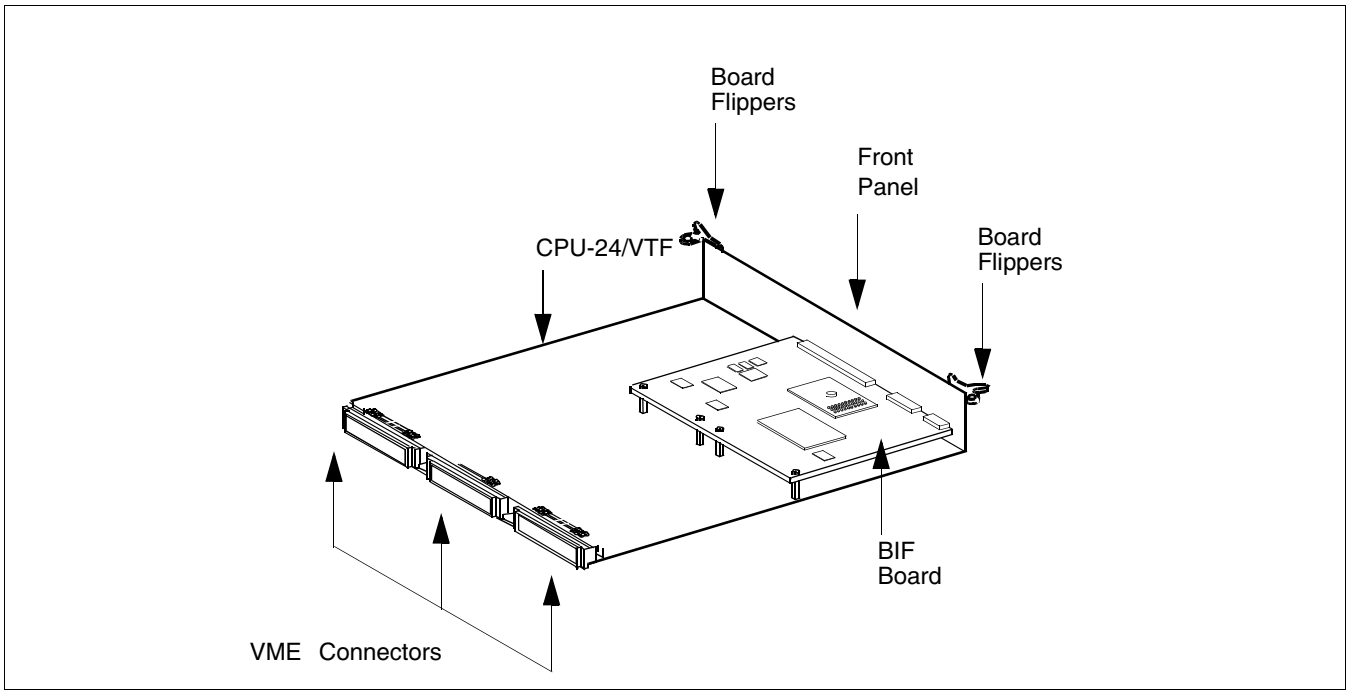
The 949-634 BIF board (pn 949-634-00) is a rider board on the CPU-24/VTF.

For more information on this board, see the Data Distribution chapter in the Catalyst Service Manual (pn 553-700-63).

The BIF has three major functions:

- SBus Interface (SBI) - translates SBus format to a local bus format
- Test Computer Interface (TCI) ASIC - controls transfers on the TCIO serial buses
- Local Bus - bus connecting SBI and TCI functions

The BIF is connected to the test computer through two SBus connectors. The card receives power from the test computer through the SBus connectors. See the figure CPU-24/VTF with 949-634 BIF.



CPU-24/VTF with 949-634 BIF

PCI BIF Board

The PCI BIF Board (pn 949-823-00) resides in PCI slot three. The TCIO busses are connected at J1 and J2 and cabled out to the PACS backplane and the system reference clock. See the figures Ultra 10 Rear View or Ultra 60 Rear View.

Terabus Adapter (TBA) Board

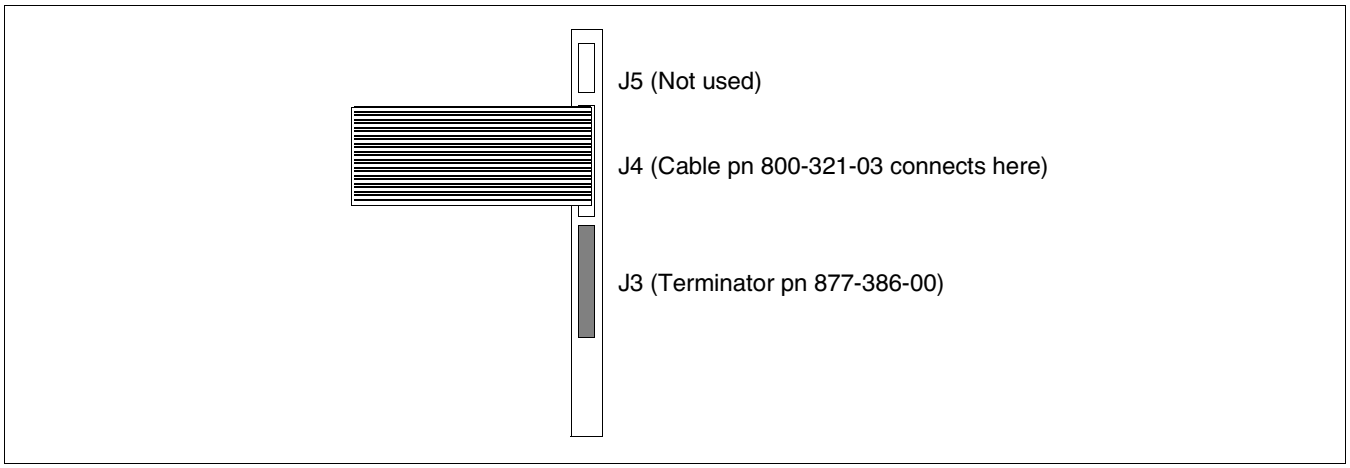
This board provides the data and control interface between the test system hardware VME bus and the circuit board Terabus. The terabus adapter board supports four optimized address/data transfer modes, an interval timer (that is capable of counting up to 72 minutes), a setting delay timer and various system control functions such as supply gating and alarm status readback.

The Terabus general purpose bus can support up to 15 interfaces and has a maximum length of 60 feet (~18.2 meters).

For more information, see the Data Distribution chapter in the Catalyst Service Manual (pn 553-700-63).

879-700-03 TBA Board

The 879-700-03 TBA board is located in slot 4 of the VME card cage. See the figure VME Card Cage. The 879-700-03 has three connectors, two Terabus outputs (J4 and J3) and J5 which is reserved and not used. Catalyst uses the J4 connector (low speed) to distribute the Terabus to the tester hardware through a 60 pin ribbon cable (pn 877-386-00). Connector J3 is terminated with a terminator plug (pn 877-386-00) See the figure 879-700-03 TBA Board. The J4 bus is terminated at the AD701 terminator board.



879-700-03 TBA Board

PCI TBA Board

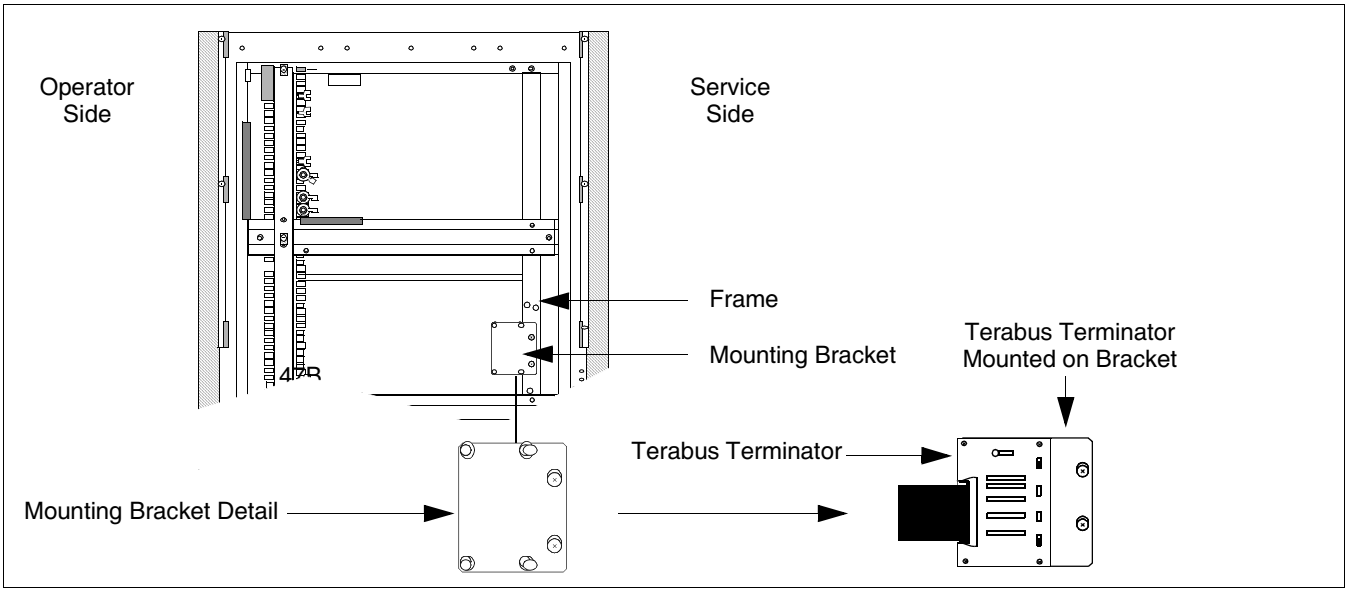
The PCI Terabus Adaptor Board is housed in PCI slot four on the Ultra 10. The TBA cable (pn 804-256-00) connects to the TBA board at connector J4 of PCI slot 4 then to the Terabus, which is cabled out to the system.

The Terabus Terminator attaches to connector J3 of PCI slot 4 of the TBA card in the Ultra 10 test computer. See the figure Ultra 10 Rear View or Ultra 60 Rear View.

Terabus Terminator Board

The Terabus terminator board (pn 879-701-00) terminates all signals on the Terabus. When facing the operator side of the cabinet, the Terabus terminator is located in the middle of the right side. The terminator mounts onto a bracket that attaches to the frame. See the figure Terabus Terminator Board.

A termination control signal for each bus is sent back to the TBA board, enabling readback of proper termination through the 879-700 Status and Control Register (CSR). The terabus terminator receives +5V for its termination resistors from a nearby bus bar.



Terabus Terminator Board

General Purpose Interface Bus (GPIB) Board

If the GPIB board is used to provide optional connection to outside devices such as handlers or probers, the GPIB Bus extender is needed. If the GPIB board is used to provide connection to internal devices such as the precision multimeter (PMM) then no additional options are needed. For more information on cabling, see Replacing the IEEE Bus Extender in Servicing the ELMA Test Computers.

The optional GPIB interface option is a National Instruments GPIB-1014P. The option translates data from the VME bus into the appropriate GPIB (General Purpose Interface Bus) messages and signals understood by instruments (such as the Precision Multi Meter) that are connected to the GPIB-488 bus. If this board is installed, the optional IEEE bus extender may also be installed. See GPIB Bus Extender Option.

GPIB-488 Board

The GPIB board is a 3U board, a third the size of the CPU-24/VTF. The GPIB board kit comes with a 9U adapter frame that allows the GPIB board to be placed securely in the card cage. If the option is present, the board is located in slot 5 of the VME card cage. See the figure VME Card Cage.

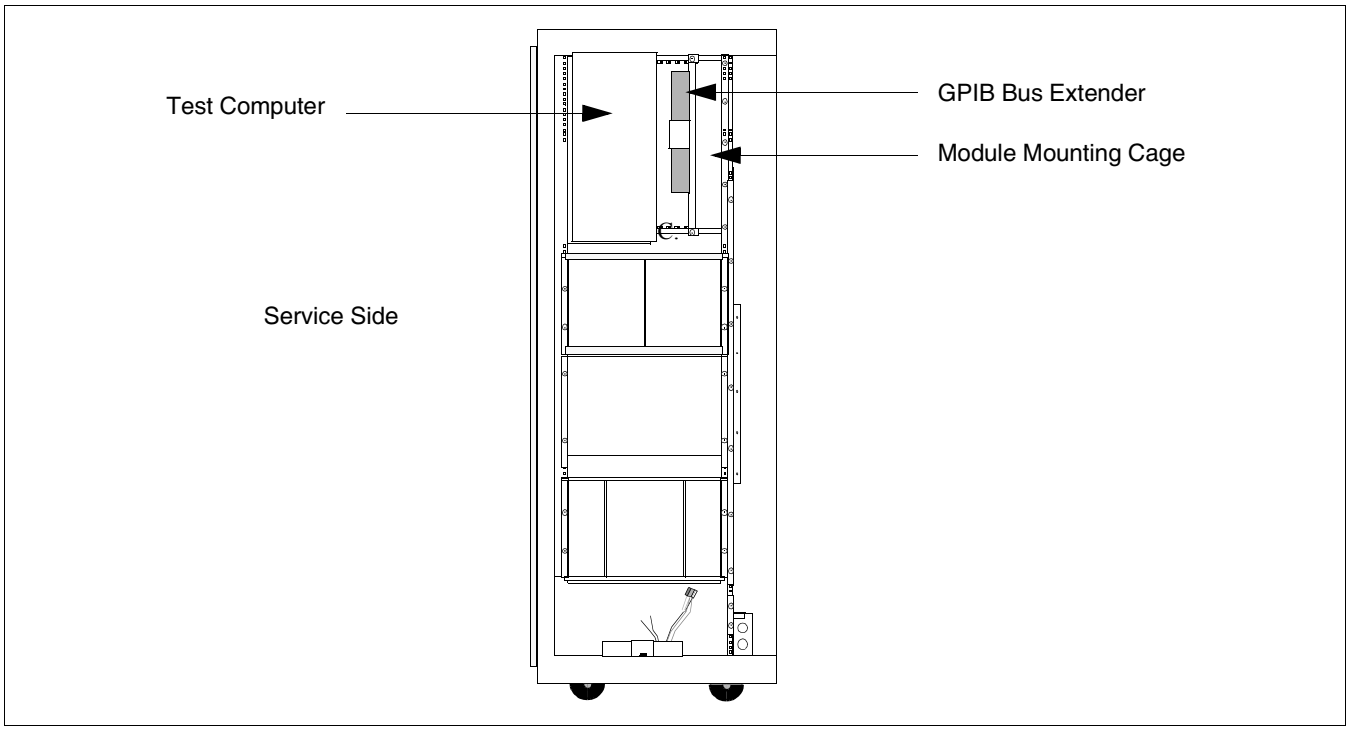
PCI GPIB Board

The PCD GPIB Board is a standard PCI board that resides in PCI Slot 2 of the Ultra series test computer. See the figure Ultra 10 Rear View or Ultra 60 Rear View.

GPIB Bus Extender Option

The GPIB bus extender option connects to the GPIB bus. It optically isolates the customer's GPIB-488 instrumentation from the internal GPIB-488 bus. GPIB access is made available at the bulkhead.

The GPIB bus extender option is located in the option space, located to the right of the test computer card cage (when viewed from the service side). The extender mounts onto a plate with a bracket and placed into slot 5 of the module mounting cage. See the figure Location of GPIB Bus Extender.



Location of GPIB Bus Extender

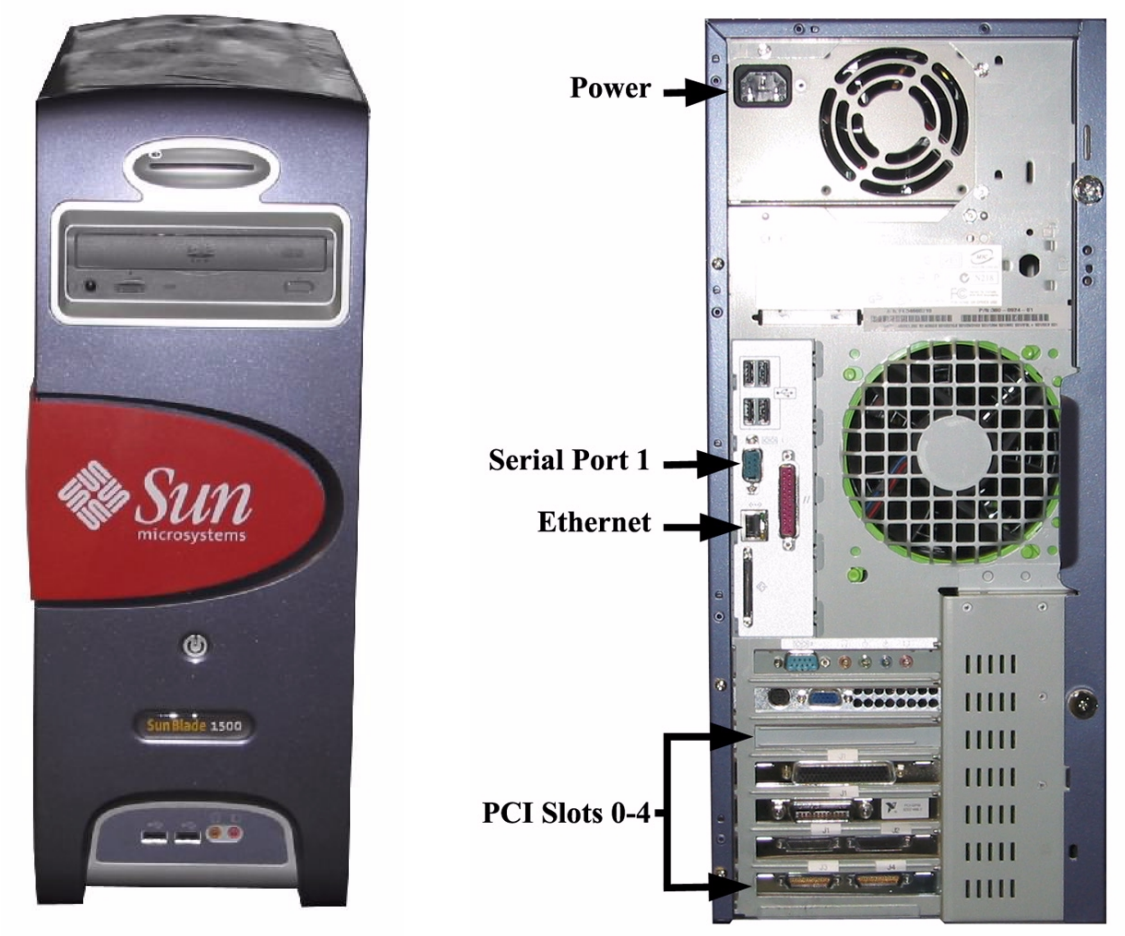
PCI RS232 Serial Expansion Board

The RS232 Serial Expansion Board (pn 425-462-00) duplicates the serial I/O (RJ-45) connectors on the front panel of the CPU-24/VTF Front Panel in the ELMA card cage. This board resides in PCI slot one in the Ultra series test computer. See the figure Ultra 10 Rear View. To verify the RS232 Serial Expansion board, refer to Verify the RS232 Serial Expansion Ports in Software Commands and Tests.

Sun Blade Series Test Computer

The test system may use a SUN Sun Blade 2500 (UltraSPARC IIIi) workstation (445-036-00) as its tester computer. The Sun Blade 2500 tester computer is the latest SUN test computer.

The SUN Sun Blade 2500 test computer resides inside the support cabinet. Refer to the figure Sun Blade Tester Computer 2500 throughout this topic.



Sun Blade Tester Computer 2500

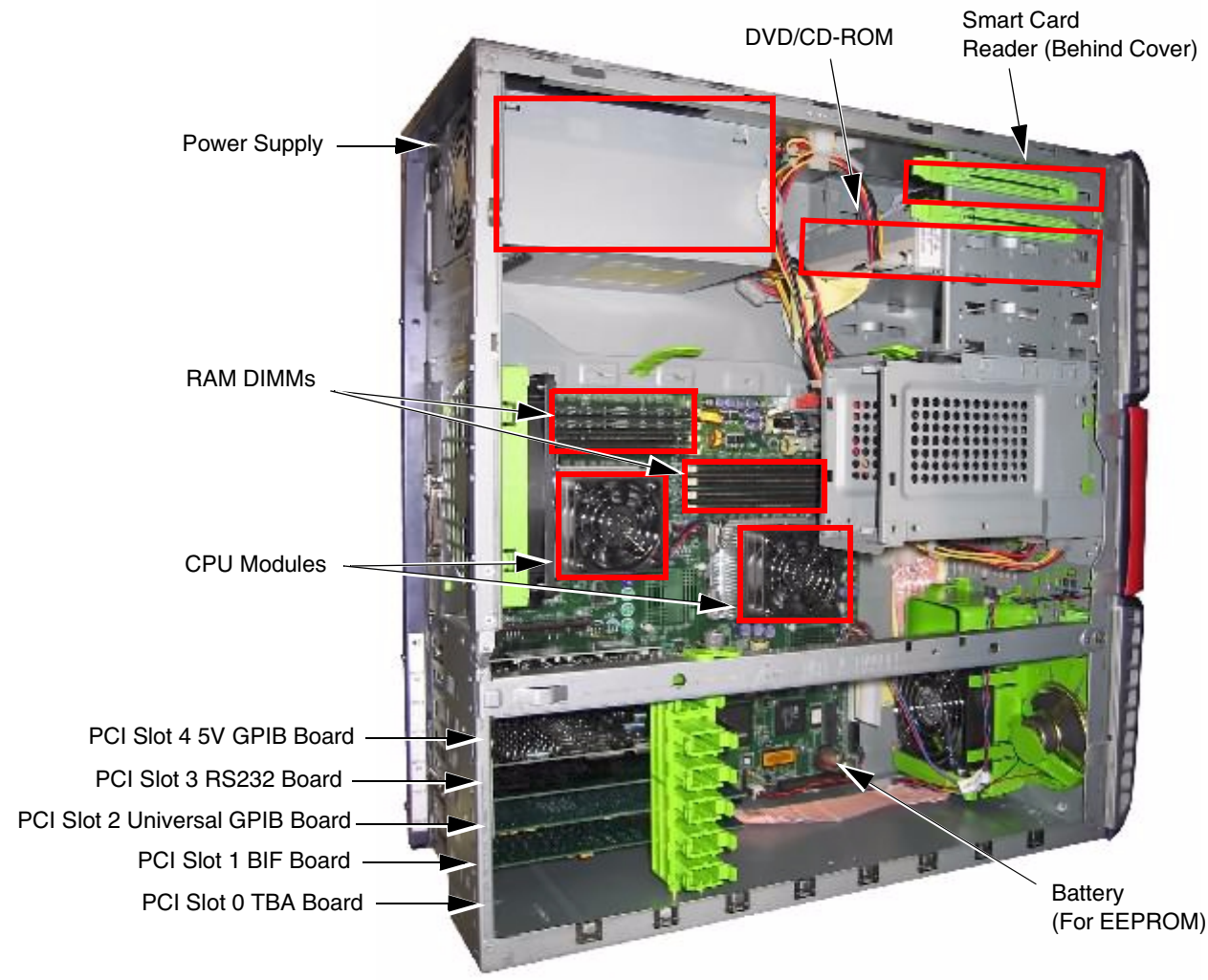
This topic consists of the following subtopics:

- Sun Blade 2500 Test Computer Configuration
- Sun Blade 2500 Cables
- Sun Blade 2500 PCI Boards
- Sun Blade 2500 External Components

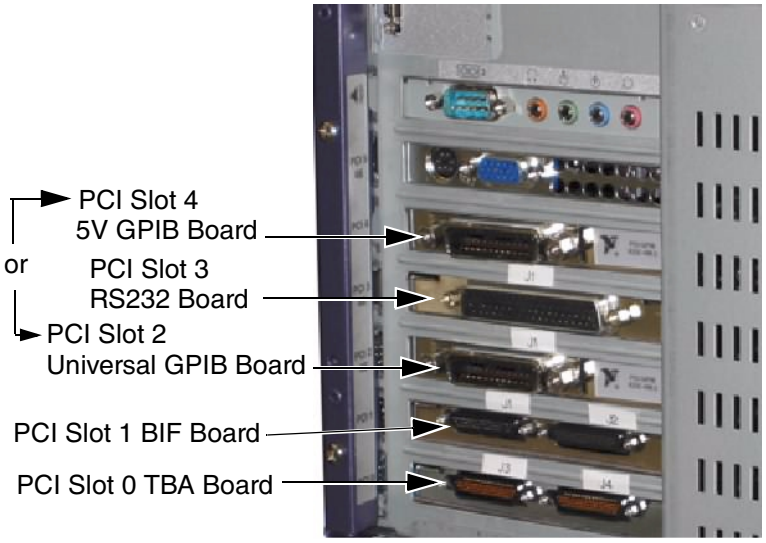
Sun Blade 2500 Test Computer Configuration

The Sun Blade 2500 workstation contains the following specifications (see the figures Sun Blade 2500 PCI Configuration, and Tester Computer Internal View):

- Two 1.28 GHz UltraSPARCIIIi CPU modules (360-090-00)
- PCI bus 64-bit architecture with six slots. Three slots run at 66 MHz, and three slots run at 33 MHz
  - Slot 0 Terabus Adapter Board (949-824-01)
  - Slot 1 Bus Interface Board (949-823-00)
  - Slot 2 General Purpose Interface Bus Board Universal (425-432-00)
  - Slot 3 RS232 Serial Expansion Board (425-462-00)
  - Slot 4 General Purpose Interface Bus Board (5V) (425-432-00)
- 10/100/1000 Base-T Ethernet connection
- 2 GB RAM (two 1-GB DIMMs) (360-089-00)



Tester Computer Internal View



Sun Blade 2500 PCI Configuration

Sun Blade 2500 Cables

The following cables are used on the rear panel of the Sun Blade 2500:

- Cable 811-112-00 Tester Computer to Ethernet Switch Cable
- Cable 811-115-00 SB 2500 Serial Port 1 to SB1500 Serial Port 2 Cable
- Cable 807-387-02 208 VAC Ultra Power Cable

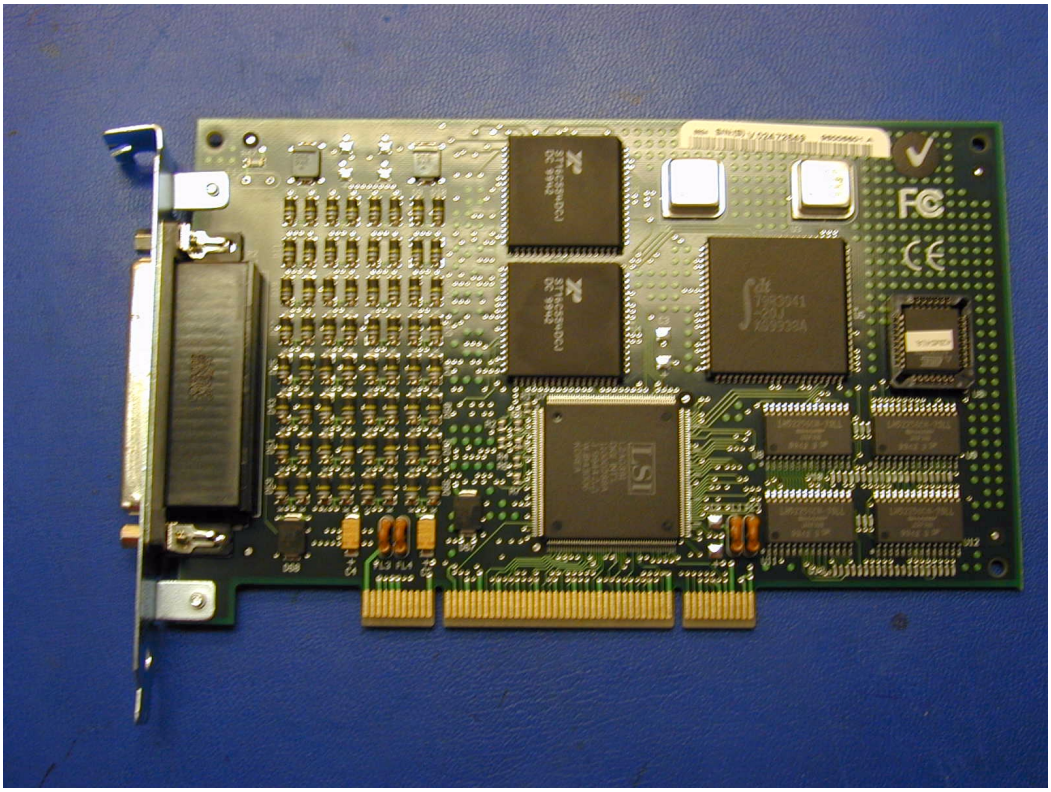
Sun Blade 2500 PCI Boards

The Tiger test system uses four primary types of interface boards:

- RS232 Serial Expansion Board
- General Purpose Interface Bus Board Universal
- Bus Interface Board
- Terabus Adapter Board

RS232 Serial Expansion Board

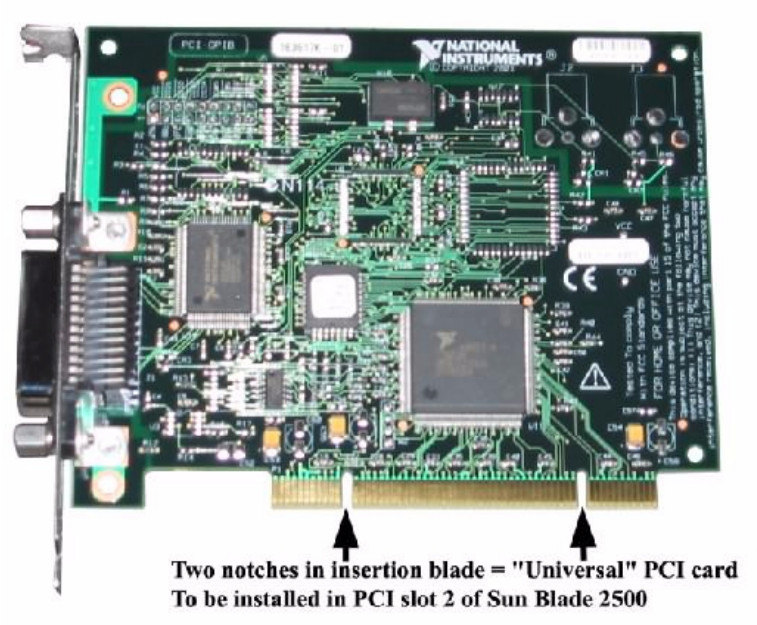
The RS232 serial expansion board (425-462-00) connects the test system with external devices. It is a short PCI board and resides in PCI slot 3. See the figure Sun Blade 2500 Tester Computer RS232 Board.



Sun Blade 2500 Tester Computer RS232 Board

General Purpose Interface Bus Board Universal

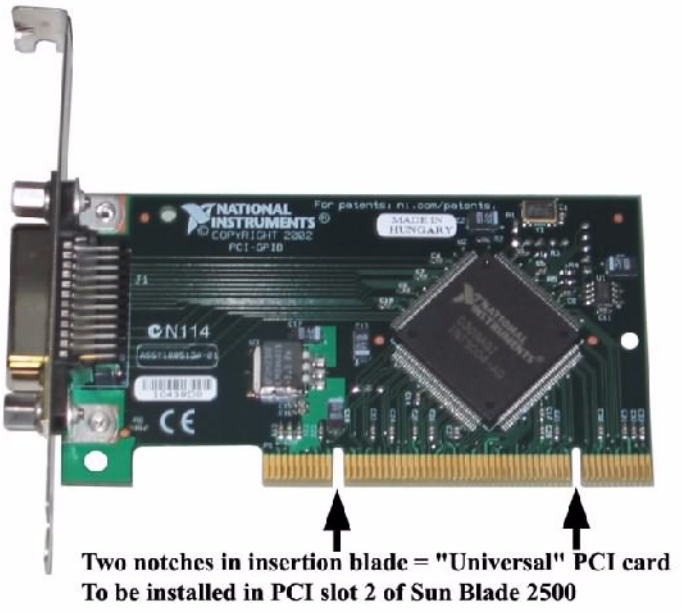
The general purpose interface bus (GPIB) board (425-432-00), also known as the IEEE 488, is a short PCI board. The board connects the test system with external devices and connects to the optional precision multimeter (PMM). Universal GPIB boards reside in PCI slot 2. 5V GPIC boards reside in PCI slot 4. See the figures Sun Blade 2500 Tester Computer GPIB U2, and Sun Blade 2500 Tester Computer GPIB U1.


PCI-GPIB
NATIONAL INSTRUMENTS
Two notches in insertion blade = "Universal" PCI card
To be installed in PCI slot 2 of Sun Blade 2500

Sun Blade 2500 Tester Computer GPIB U2

Note

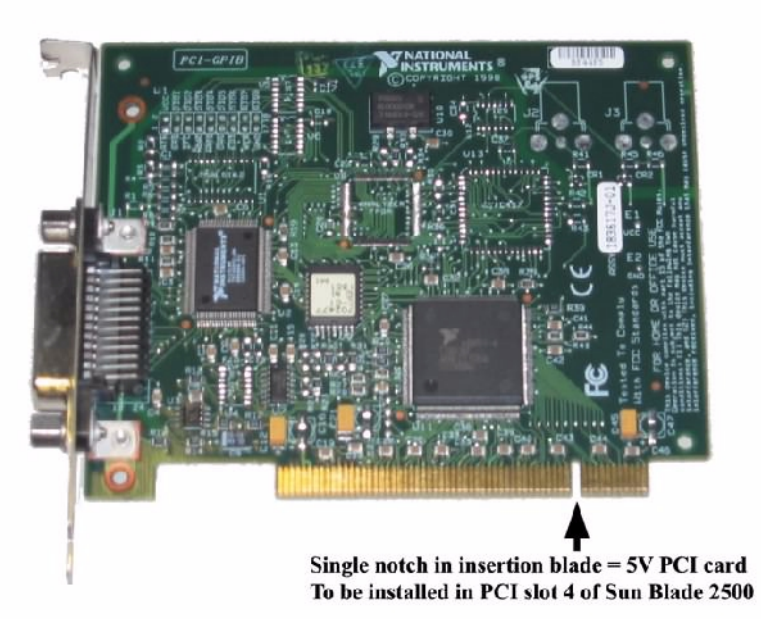
The Universal and 5V GPIB boards are functionally equivalent.


NATIONAL INSTRUMENTS
COPYRIGHT 2002
PCI-GPIB
MADE IN HUNGARY
CN114
Two notches in insertion blade = "Universal" PCI card
To be installed in PCI slot 2 of Sun Blade 2500

Sun Blade 2500 Tester Computer GPIB U1

General Purpose Interface Bus Board (5V)

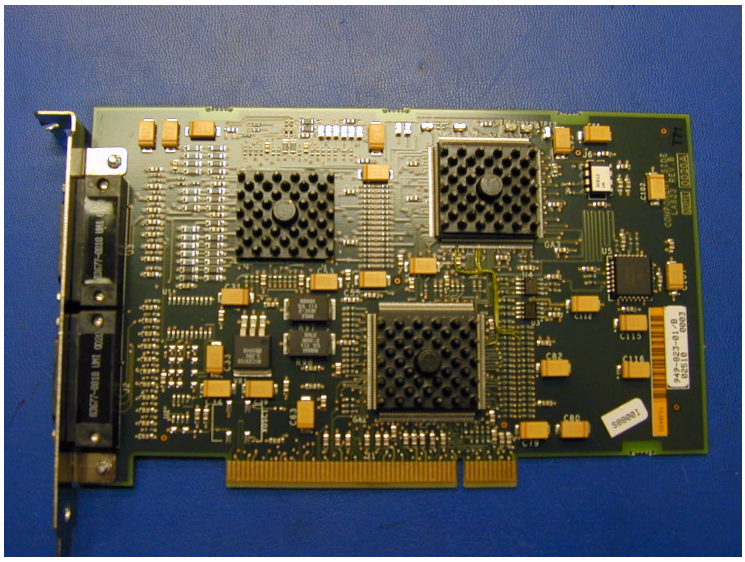
The GPIB bus expander option connects to the GPIB board. It isolates the customer's GPIB-488 instrumentation from the internal GPIB board. It also eliminates ground loop noise and expands the GPIB cable limit. See the figure Sun Blade 2500 Tester Computer GPIB 5V.



Sun Blade 2500 Tester Computer GPIB 5V

Bus Interface Board

The bus interface (BIF) board (949-823-00) allows high-speed data and control function transfers between the test computer and the digital and PACS subsystems. It is a short board and resides in PCI slot one. See the figure Sun Blade 2500 Tester Computer Bus Interface Board.



Sun Blade 2500 Tester Computer Bus Interface Board

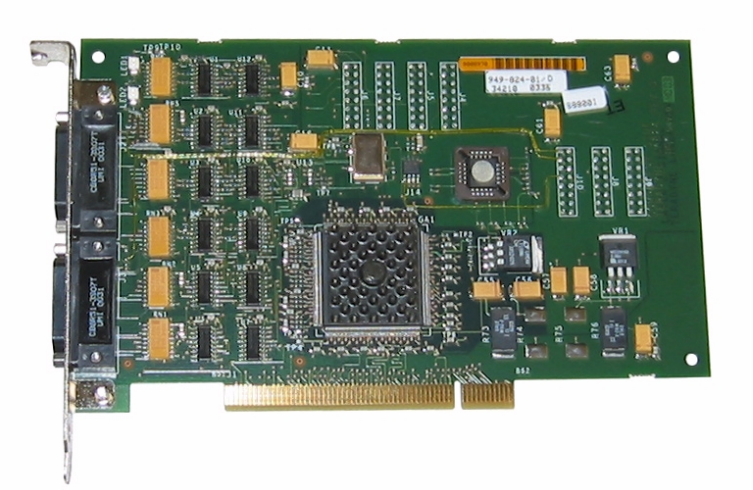
Terabus Adapter Board

The Terabus adapter (TBA) board (949-824-01) generates the Terabus. The TBA board is a long circuit board that resides in PCI slot zero.

The TBA adapter cable (804-256-00) connects to the TBA board at connector J4 of PCI slot zero. See the figure Sun Blade 2500 Tester Computer TBA.

Note

The J3, "high speed" connector has a hardwire termination. No external terminator needs to be connected to connector J3. The J4 connector is the "low speed" connector.



Sun Blade 2500 Tester Computer TBA

Sun Blade 2500 External Components

The following components are available for the Sun Blade 2500.

Terabus Terminator Board

The Terabus terminator board (879-701-00) terminates all signals on the Terabus.

Overview

The Catalyst system network serves two main functions. Its primary function is to communicate between the test and user computers via the 10/100Base-T or 10Base-T hub. The secondary purpose is to connect the test system to the customer's Ethernet network.

The following sections describe network options, equipment and commands:

- Types of Configurations
- Network Connections
- Network Equipment (Ethernet Hub)
- Network File System
- Network Information Service

The following terms are used in this section:

Gateway	A means of connecting two or more networks.
Internet address	A unique number used to identify a computer in a network. The term Internet Protocol (IP) address is also used to refer to the Internet address.
Network	A collection of at least two systems connected by Ethernet.
Subnet	A portion of a larger network used to define a group or subsystem.

Types of Configurations

In this document, “network configurations” refers to the Ethernet connections of the tester and user computer with respect to the rest of the in-house network and beyond. For example, a “private” configuration is established when the test and user computers are isolated from the factory’s normal network traffic.

There are two optional configurations used to connect the test system to the customer’s network: stand-alone and private. The stand-alone and default public configurations use the Magnum 10/100Base-T Ethernet hub. However, some public and stand-alone test systems may use 10Base-T hubs. The private configuration uses the 10Base-T hub only.

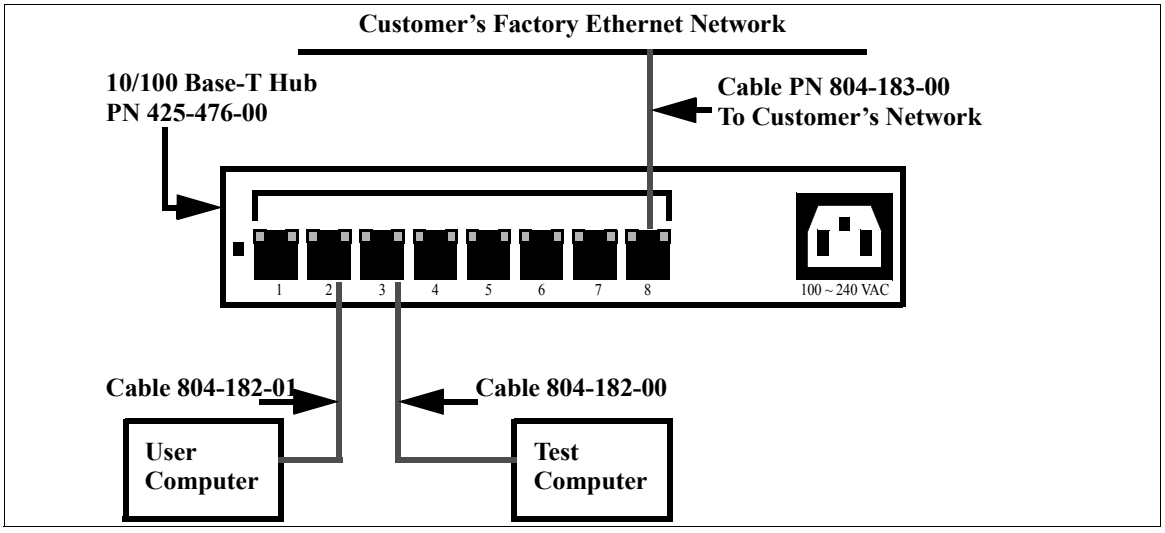
Public/Private Network

The default Catalyst and Catalyst LC network configuration is the public/private network. In a private/public network, the test system connects directly to the customer’s network via the new 10/100Base-T Ethernet switching hub. The hub acts as a gateway between the test system and the customer’s network. This Ethernet configuration allows the test computer to communicate with the user computer without unnecessarily being affected by traffic on the customer’s network, improving test time and accuracy. Unlike earlier configurations, the new public/private network does not require a separate subnet number for each test system.

The public/private configuration includes the following equipment:

- A user computer with one Ethernet interface
- One test computer
- One 10/100Base-T Ethernet switching hub (pn 425-415-00)
- Three Ethernet cables (pn 804-182-01, 804-182-00 and 804-183-00)

See the figure 10/100 Base-T Ethernet Cabling.



10/100 Base-T Ethernet Cabling

Stand-Alone Network

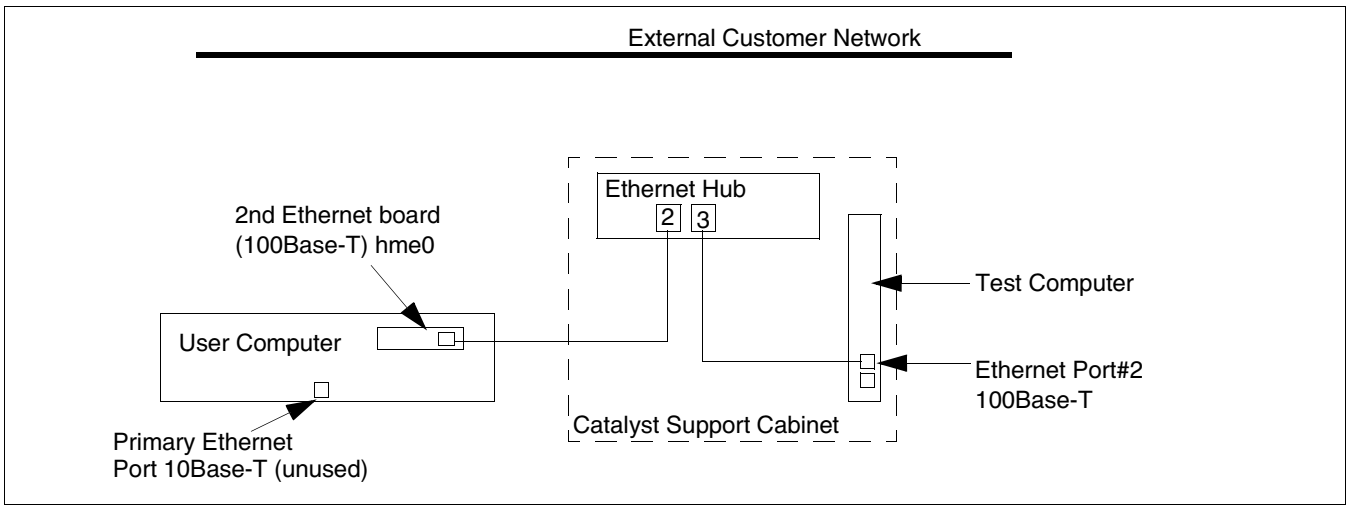
The stand-alone network allows internal communication between the user and test computer only. Each computer is connected to the 10/100Base-T hub by separate cables, which act as the link between both computers. In this network configuration, the test system is not connected to the customer's network. To connect the test system to the factory network the customer needs additional (optional) network interfaces. See the figure Computer Subsystem Flow Diagram for more information.

The advantage to the stand-alone configuration is that no external network issues or traffic can affect the test system. This allows you to isolate faults and tests at the system. The disadvantage is that there is no communication with the external network, which can be useful for verifying results.

The standard configuration includes the following equipment:

- A user computer with one Ethernet interface (on the mother board)
- One test computer
- One 10/100Base-T hub (pn 425-476-00)
- Two cables (pn 804-182-01 and 804-182-00)

See the figure Stand-Alone Configuration.



Stand-Alone Configuration

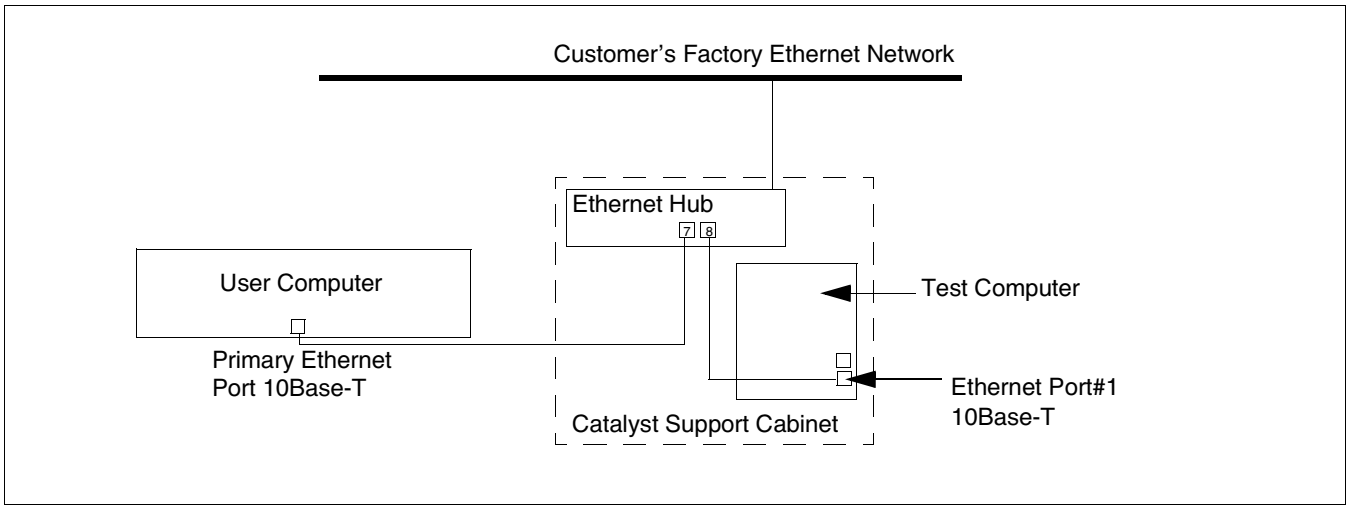
Public Network

A public configuration is established when the tester and user computers are not isolated from normal external network traffic. The advantage to this is that the user and test computers only need two IP numbers assigned (one for the user and one for the tester computer). Additionally, the two computers do not need a separate subnet. This is a major benefit because an entire subnet does not need to be allocated for each system.

The disadvantage to having a public configuration is that the user computer becomes subject to all external network traffic. This can effect test times and overall computer operation. Teradyne, therefore, recommends using the private/public network configuration, instead of a public configuration for our testers.

To create a public configuration, connect the user and test computer to separate ports on the 10Base-T Ethernet hub and then connect an additional port on the hub to the external network. See the figure Public Configuration. Another way to establish a public network configuration is to directly plug both the user and test computer into the customer's factory network. Teradyne does not recommend this configuration because the user computer and test computer are forced to communicate via the factory's network, which can slow and distort test times and results.

The figure Public Configuration shows an example of the public network. In this configuration the test computer and user computer are linked to the 10/100Base-T Ethernet switching hub, which is connected via a cable (pn 804-183-00) to the customer's factory network. This network requires only two host addresses on the customer's network.



Public Configuration

Private Network

A private configuration is created when the tester and user computer are isolated from external network traffic. This is an advantage because the private configuration shields testing from external network traffic. Therefore, problems associated with network infrastructure failure have less impact on system performance.

The disadvantage to this configuration is that it requires a separate dedicated subnet for each system. This can cause problems because each company only has a finite number of subnets.

The private network is no longer available with the new 10/100Base-T Ethernet switching hub. In some 10Base-T systems, the test system connects to the customer's network via a second Ethernet controller board in the user computer. The benefit of this configuration was that a system's traffic remained isolated from the customer's normal network traffic but still could communicate the customer network. The new public network functions similarly to the old private network but uses the 10/100Base-T Ethernet switching hub's increased speed and precision.

The figure Private Ethernet Configuration shows an example of the private network configuration. In this configuration, the user computer contains a second Ethernet board that allows the user computer to act as a gateway between the test system and customer's network. This configuration requires one client address on the customer's network for the gateway (network "1") and two addresses on a separate network for the test computer system (network "2"). For more information, refer to the Software Installation Guide or see your system administrator.

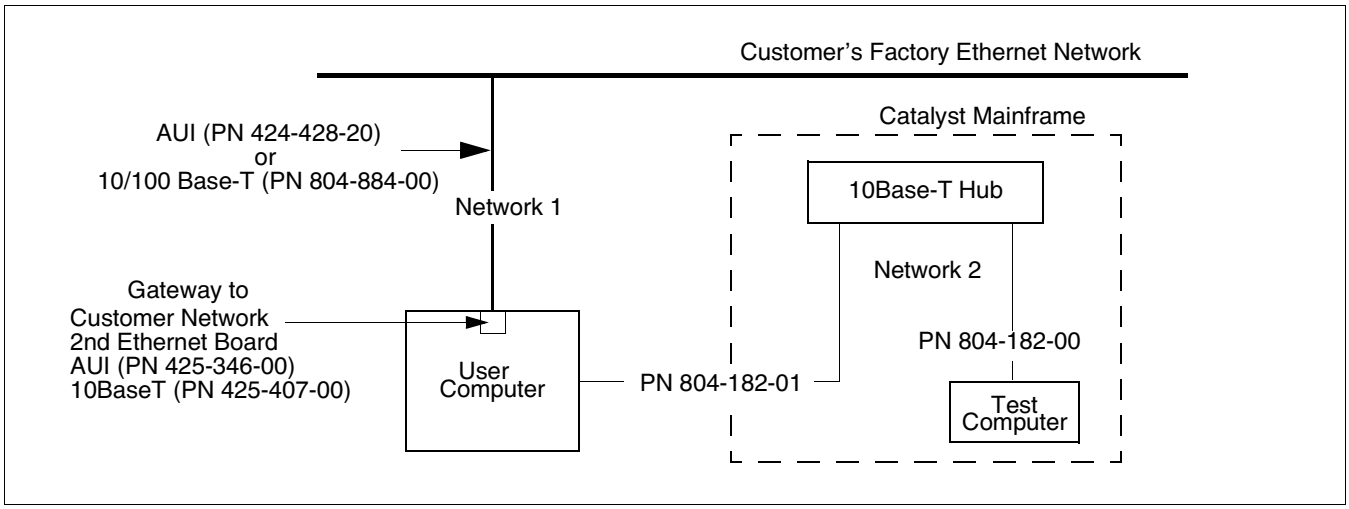
The private configuration includes the following equipment:

- A user computer with an additional Ethernet Interface (pn 425-346-00 or 425-407-00)
- One test computer
- One 10Base-T hub (pn 425-407-00)
- Three Ethernet cables (pn 804-182-01, 804-182-00 and 424-428-00 or 804-884-00)

Use the AUI Ethernet board (pn 425-346-00) with the AUI cable (pn 424-428-00) or the 10Base-T board (pn 425-407-00) with the 10/100Base-T cable (pn 804-884-00).

Note

The AUI Ethernet connection (pn 425-346-00 and 424-428-00) was discontinued in January 2000 and is no longer available.



Private Ethernet Configuration

Network Equipment (Ethernet Hub)

Three types of Ethernet hubs are installed in the Catalyst system. In Catalysts made before July 1998, a 10Base-T hub is used. In July 1998 this style of hub was discontinued and replaced by the Magnum 600ES 10/100Base-T Ethernet Switching Hub (pn 425-415-00), beginning with Catalyst #105. In July of 2000, the Magnum 600ES hub was discontinued and replaced with the BayNetworks Netgear FS308 10/100Base-T Ethernet Auto-Switching Hub. In December of 2003 the BayNetworks Netgear FS308 10/100Base-T Ethernet Auto-Switching Hub was discontinued and replaced by the NETGEAR 10/100/1000 Base-T Ethernet Auto-Switching Hub.

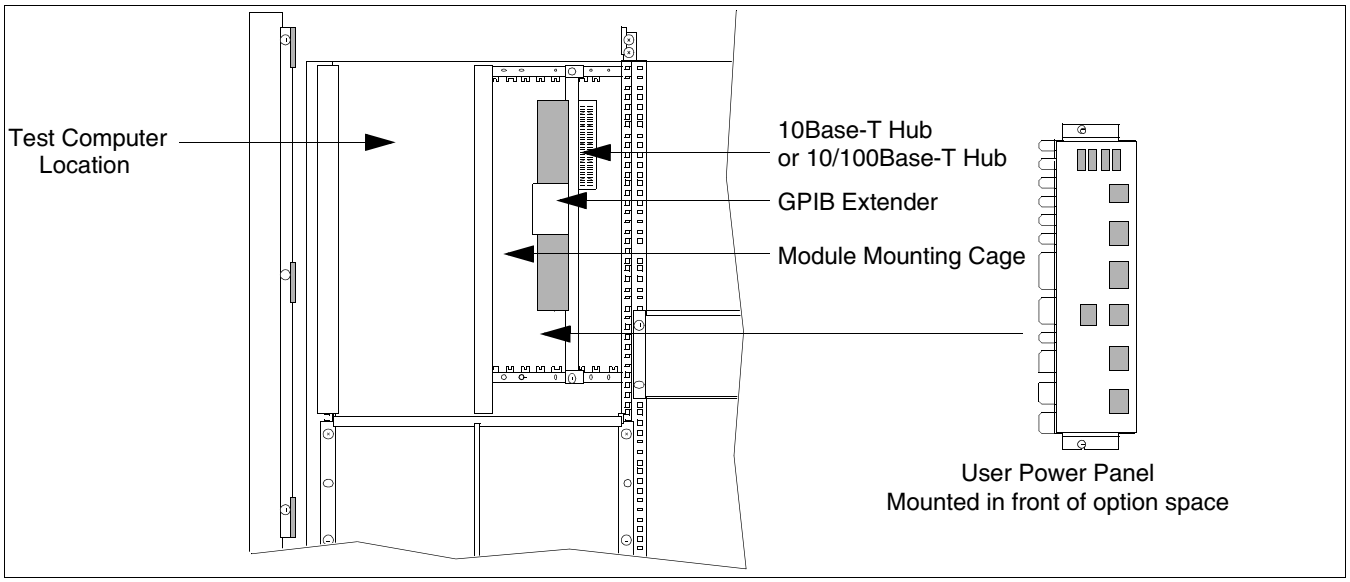
This topic contains the following subtopics:

- 10Base-T Hub
- 10/100Base-T Ethernet Switching Hub
- 10/100/1000Base-T Ethernet Switching Hub

10Base-T Hub

The 10Base-T hub is used for network connections between the user and test computer. It can also provide access to an external network depending on the computer subsystem configuration. The hub mounts in the option space beside the test computer, in the upper left column, service side. See the figure Ethernet Switching Hub Location. With additional cabling the test system can be connected to an external network. See the section Verifying the Serial Ports in Software Commands and Tests for more information about the 10Base-T hub and cabling configurations.

To access the 10Base-T hub from the service side, remove the user power panel mounted in front of the option space.



Ethernet Switching Hub Location

10/100Base-T Ethernet Switching Hub

The Magnum 600ES 10/100Base-T Ethernet switching hub (pn 425-415-00) contains two network segments. One is internal, permitting the test and user computers to communicate at 100 Mbit/second. The other connects the test system to the customer's network and can be manually switched to operate at either 10 Mbit/second or 100 Mbit/second.

The 10/100Base-T hub filters and forwards Ethernet packets in both directions. It has two address tables, one for each network segment. The capacity of each address table is 1024 addresses.

The Ethernet switching hub can “learn” addresses if the Ethernet packet is destined for a host in its address table (user or test computer).

Each time an Ethernet packet is received on one of the ports, it is evaluated for forwarding or filtering. Packets with errors are always filtered. If the destination address of a packet cannot be found in the address table of the originating segment, then this packet is forwarded to another segment.

To access the 10/100Base-T hub from the service side, remove the user power panel that is mounted in front of the option space. See the figure Ethernet Switching Hub Location.

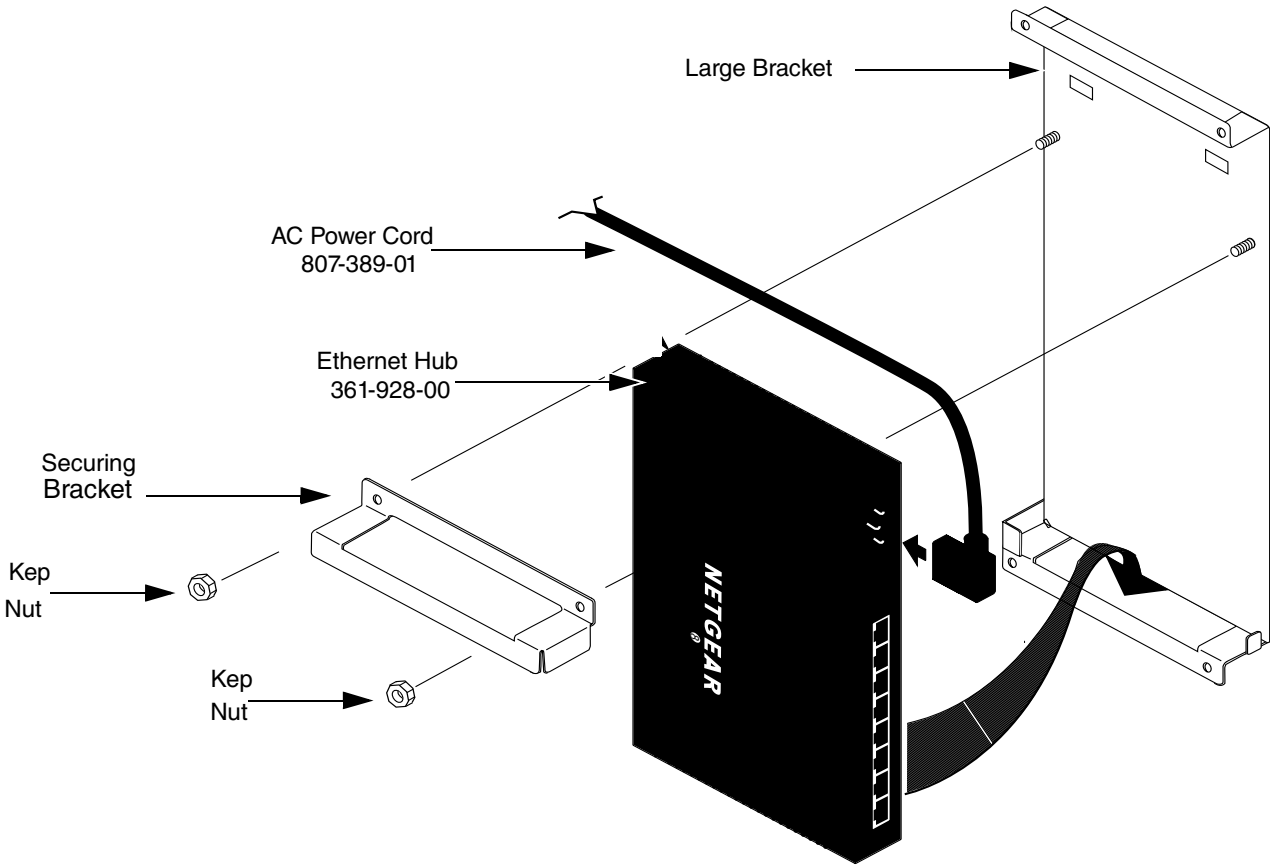
There are two major benefits to this hub:

- The tester no longer has to be on its own subnet.
- Port 6 has the ability to filter out network traffic that is not destined for the user or test computer. This essentially isolates the system from routine network traffic, allowing a private communication between the user and test computers.

The BayNetworks Netgear FS308 employs the major benefits of the Magnum 600ES hub. All eight of the BayNetworks Netgear FS308 ports include the filtering feature found on port 6 of the Magnum 600ES and include 10/100Base-T auto-switching.

10/100/1000Base-T Ethernet Switching Hub

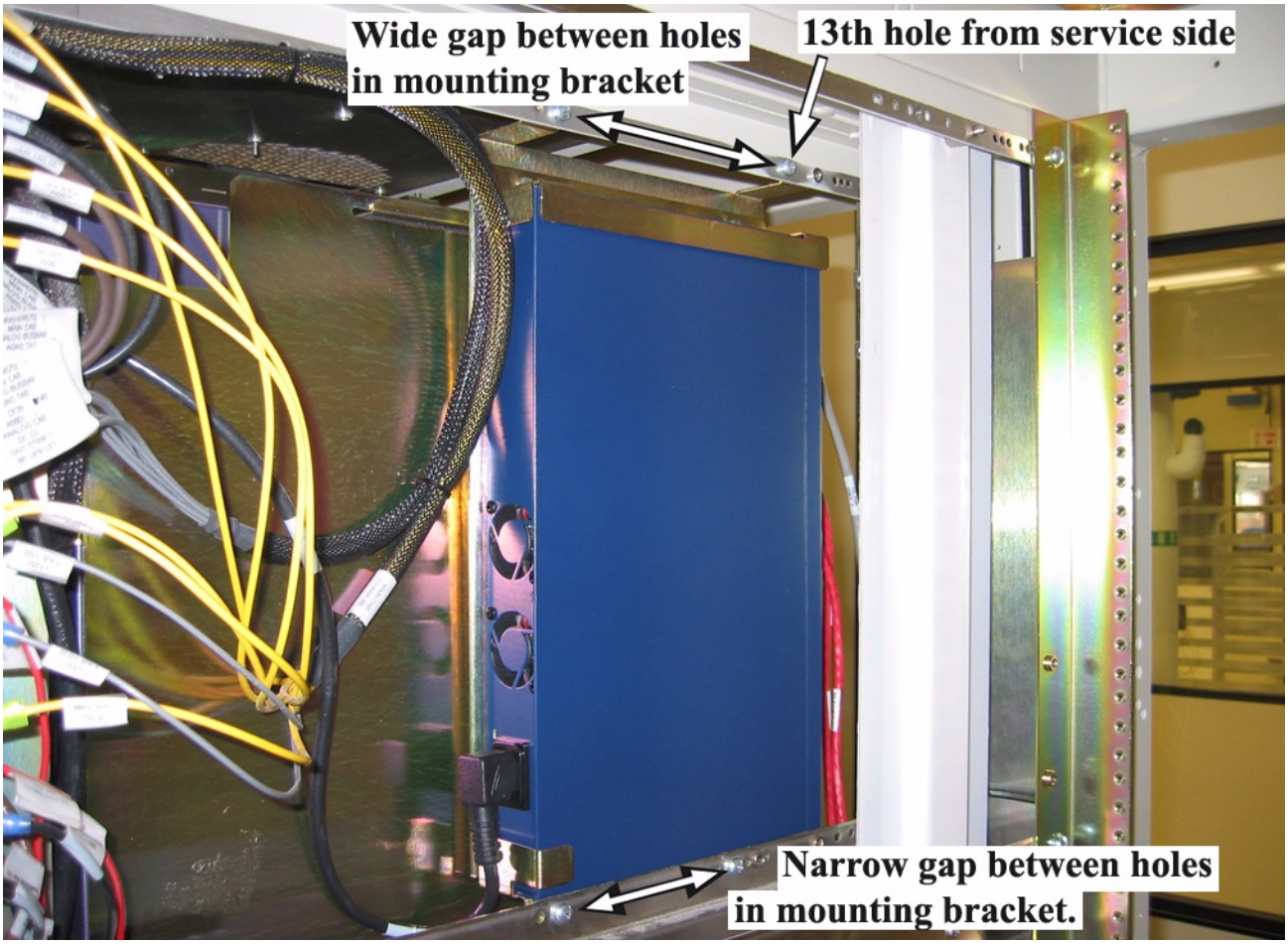
The Tiger test system uses a NETGEAR Ethernet Switch (361-928-00). See the figure Ethernet Hub Assembly. The ethernet switch resides inside the support cabinet and connects to the Sun Blade tester and user computers, as well as to the external network. See the figure NETGEAR Ethernet Switch.



Ethernet Hub Assembly

The ethernet switch is an auto-detect 10/100/1000 Base-T ethernet switch with half and full duplex. It provides 10, 100, or 1000 Mbps bandwith at each port, and contains a universal 90-240V internal power supply.

Each 10/100/1000 Mbps port automatically senses and operates at the proper speed and duplex mode. If needed, individual ports can be locked in full-duplex mode. LED indicators are duplicated on the front and back of the switch.



NETGEAR Ethernet Switch

Ethernet Switch Cables

The following cables are used on the NETGEAR switch.

- Cable 811-112-00 Tester Computer to Ethernet Switch Cable
- Cable 811-113-00 User Computer to Ethernet Switch Cable
- Cable 811-114-00 Ethernet Hub to External Network Cable

Network Connections

Serial (Tip Hardwire) Connection

The serial connection (`tip hardwire` connection) between the two computers directly links serial port A of the test computer to serial port B of the user computer. This connection, although not used extensively, has some very critical functions. See the section Common Commands in Software Commands and Tests for some `tip hardwire` commands.

Tip Hardwire Limitations

Although very useful, the tip hardwire tool has some limitations. One of them is that only one tip hardwire session can be active at any given time. When a tip hardwire session is created, Solaris creates a lock (`LCK.xxxx`) file in the `/var/spool/locks` directory of the user computer. This lock file prevents another connection at that serial port.

If the system or software is in an unstable state, a tip hardwire connection would be unsuccessful, and the screen displays `All ports busy`. If this occurs, look at any `LCK.xxxx` files in the `/var/spool/locks` directory and delete them if necessary. This requires `root` access.

To check if a tip hardwire session is in process:

1) Type `ps -elf | grep tip`
2) Find the Process ID# and type `kill -9 PID`

Ethernet Connection

The second, and by far the most active connection between the two computers, is the standard twisted pair Ethernet connection. This connection provides the main data path for test computer and user computer communication. The test computer is configured as a diskless client, relying on the user computer for disk space, file sharing, and file systems. All major data transfers such as test boot-up information and test data are transferred via the Ethernet connection. In a private configuration, the test computer also connects to an external network through the user computer.

The Ethernet connection between the two computers is not a direct path. Instead each host connects via a cable to a common hub mounted inside the support cabinet.

There are currently two different types of hubs installed in Catalysts. The Catalyst LC, however, only contains the 10/100Base-T Ethernet Switching Hub. (Beginning in July 1998, Teradyne began shipping this newer hub.) See the section 10/100Base-T Ethernet Switching Hub for more details.

hme vs. le

Both hme and le are names for Ethernet interface devices. The hme devices are typically used with the 10/100Base-T hubs. The le devices are only used with the 10Base-T hubs.

The user computer can contain more than one Ethernet device: a primary device that is part of the motherboard and an optional secondary device. A private network configuration requires the secondary device.

In a private network configuration, the primary port is le0 and the secondary port, hme0. The reason for this is that the primary port on the motherboard is the first le device and only capable of 10Base-T operation. The secondary port is the first hme device, which has 10 or 100Base-T capabilities. An Ultra 1's primary Ethernet port is an hme device with the port address hme0. If a secondary device is installed in an Ultra 1 workstation, its address is hme1.

The type of device in the system can be viewed during the "configuring network interfaces" sequence of the boot-up. Refer to The Test Computer Boot Sequence in Software Commands and Tests and the figure Network Configuration Sequence.

```
Sun Ultra 5/10 UPA/PCI (UltraSPARC-IIi 360MHz), No Keyboard
OpenBoot 3.15, 256 MB memory installed, Serial #10933504.
Ethernet address 8:0:20:a6:d5:0, Host ID: 80a6d500.
Boot device: net File and args:
28e00 hostname: pp2t
domainname: afive
root server: pp2
root directory: /export/root/pp2t
SunOS Release 5.5.1 Version Generic-103640-23_TERADYNE
[UNIX(R) System V Release 4.0]
Copyright (c) 1983-1996, Sun Microsystems, Inc.
Central Data PCI Driver R1.002 configured
Central Data PCI-4 Serial Card (PLX9050 PCI chip)
configuring network interfaces: hme0.
Hostname: pp2t
Mounting /dev/swap for swap
```

Network Configuration Sequence

Note

Earlier versions of the SparcStation 5 shipped with le0 and le1 devices.

Network File System

A Network File System (NFS) provides transparent file access to remote files over a network. When mounted, remote file systems appear to be a local file system. An NFS client accesses and mounts file systems that are shared over a network by an NFS server and treats them as if they were a local file system. An NFS server designates local file resources which are shared with other machines on the network. The server reads or writes files based upon requests from the client. A client is any machine or UNIX process that assesses network services. In a Catalyst or Catalyst LC, the test computer is an NFS client. Any computer with a local file system can be used as an NFS file server. For more information on the network file system, refer to the Software Installation Guide.

Because the test computer is a diskless client, it does not have a mass storage device (hard disk) of its own. It relies on another source for the software resources and memory storage space that would exist on a standard computer workstation. The user computer is this source. It provides exportable (shared) file systems for boot-up and other purposes. The test computer may have problems booting properly if it is unable to access those files systems via its intra/Ethernet connection. See The Test Computer Boot Sequence in Software Commands and Tests for an analysis of the test computer boot sequence.

When a file is read from or written to an NFS file system on a network, the read or write calls are made over the network via Remote Procedure Call (RPCbind). The RPCbind mechanism performs the read or write operation needed on the server's file system on behalf of the client.

Network Information Service

The Network Information Service (NIS), formerly known as YP Services (or YP), is a standardized database that contains information pertinent to the low level operating system. This includes information such as password entries, boot prams, ethers entries and NIS maps.

NIS can be configured in numerous ways, which are generally specific to each site. Teradyne configures the user computer as an NIS master and the test computer to as the NIS client.

The master server keeps the master copy of the NIS in a central location so that all computers on a network have access to it. NIS stores information in a database referred to as maps. All map creation and modification is done on the master server.

If the user computer at a customer site is configured as a slave server, it obtains its maps from the NIS master server. In this case, changes to NIS maps are implemented at the master server level then passed onto the slave servers. An NIS domain is a collection of computers sharing a common set of maps. Every domain has a different domain name. Each NIS domain can only have one master server, although there can be several slave servers on a network. There are usually multiple clients in an NIS domain.

The test computer relies on the NIS maps located in the user computer's `/etc directory` (assuming the user computer is the NIS master) to configure its boot server.

Overview

Note

Much of the material presented in this chapter is adapted with permission from Sun. It is recommended that the user consult the Sun documentation shipped with the computer components for the most up-to-date information.

This chapter describes the installation procedure for new or upgrade internal devices used in the SS5 and Ultra 1 user computers. The chapter contains the following topics:

- Preparing to Replace a Component
- Replacing a Power Supply
- Replacing a Hard Disk Drive
- Replacing an Internal Floppy Drive
- Replacing an Internal CD-ROM Drive
- Replacing Memory
- Replacing SBus Boards
- Replacing a Motherboard
- Verifying/Changing the RS232/423 Jumpers
- Completing the Replacement

Preparing to Replace a Component

Prior to replacing a component, perform the following procedures to prepare the computer for servicing.

Checklist for Servicing the User Computer

The Checklist for Servicing the SS5 or Ultra 1 User Computer is a list of the replacement procedures for several components of both the SS5 and Ultra 1 user computer. Print this checklist to help keep track of servicing procedures and troubleshooting.

Checklist for Servicing the SS5 or Ultra 1 User Computer

➨	Procedure
Prepare the System	
	Preparing to Replace a Component
	Configure SCSI Peripherals (if necessary)
	Shut Down the User Computer
	Disconnect the User Computer
	Open the User Computer
Replace User Computer Components	
	Replacing a Power Supply
	Replacing a Hard Disk Drive
	Replacing an Internal Floppy Drive
	Replacing an Internal CD-ROM Drive
	Replacing Memory
	Replacing SBus Boards
	Replacing a Motherboard
	Verifying/Changing the RS232/423 Jumpers
Complete the Replacement	
	Close the User Computer
	Reconnect Cables
	Boot the User Computer

Prepare the Computer for Servicing

Before replacing any component, perform the following four steps:

1) Configure SCSI Peripherals.
2) Shut Down the User Computer.
3) Disconnect the User Computer.
4) Open the user computer.

   For the SS5, refer to Open the SS5.

   For the Ultra 1, refer to Open the Ultra 1.

! Caution

Computer equipment is extremely sensitive to static electricity. Handle boards and modules only by the edges and always wear a ground strap when handling them. When replacing or installing computer equipment, move the computer to a static free environment.

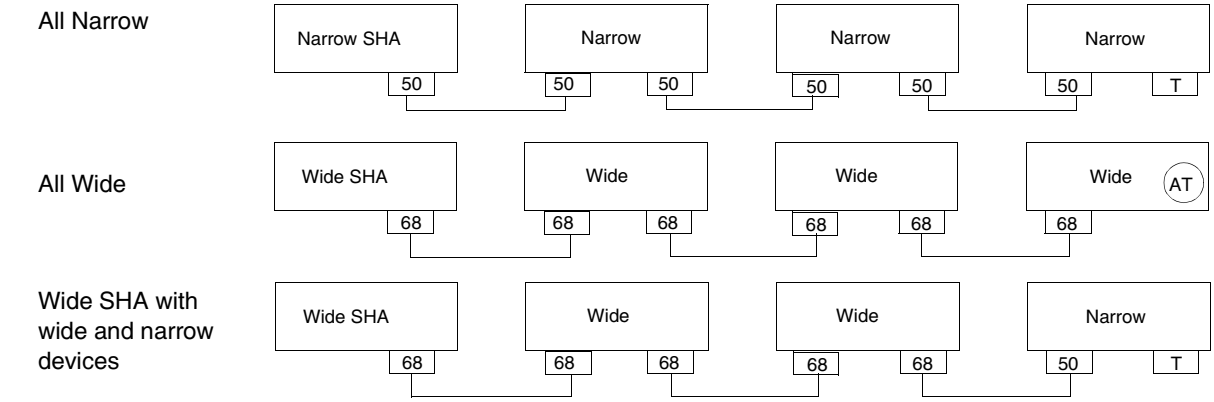
Configure SCSI Peripherals

The user computers have SCSI (Small Computer Systems Interface) connectors for installing SCSI peripherals.

The system performs reliably with a maximum SCSI bus length of 19.7 feet (6 meters). The total length of the external SCSI cables and the internal signal path of the user computer and optional SCSI peripherals must not exceed this maximum bus length or the system may not run in a reliable manner.

When SCSI devices are connected to the system in a daisy chain, the last unit must be terminated. Ultra SCSI devices do not need to be terminated. If no external devices are connected to the system, do not terminate the SCSI bus on the back of the workstation. Some devices (such as the 9 Gbyte external hard drive) are self-terminating.

There are specific cabling conventions that must be followed depending on the SCSI architecture being used. Refer to the figure Cabling Conventions.



Cabling Conventions

Determine SCSI ID Numbers

Each SCSI device installed must have a unique SCSI ID number. The table SCSI ID Numbers lists the Teradyne-specified SCSI ID numbers.

SCSI ID Numbers

Device	SCSI ID Number (SS5)	SCSI ID Number (Ultra 1)	SCSI ID Number (Ultra 5)
Internal Disk 1	3	0	N/A
Internal Disk 2	1	1	N/A
External Disk 1	2	2	0
External Disk 2	0	3	1
External Tape Drive	4	4	N/A
Other Device	5	5	5
CD-ROM Drive	6	6	N/A

In the SS5 or Ultra series, the physical location of the internal hard disk drive determines the SCSI ID number assigned to that drive. A disk located in the lower level is designated disk 1 while the disk in the upper level is designated disk 2. It is not necessary to physically change the jumper settings on the internal hard disk drives because when the device is installed the SCSI target ID is established by the physical location of the device. If the device is removed, it should be replaced in the same physical location or the SCSI ID numbers will not coincide with any previously installed software.

Change the SCSI ID Numbers

The SCSI ID numbers for devices (excluding the internal hard drives) may need to be set. Most devices have a window on the rear panel of the device that shows the setting of the SCSI ID number. The setting is changed by either clicking a rotor switch or changing jumper settings on the device itself. The procedure to change the jumper settings is explained in the installation manual shipped with each device. These instructions, or an ID number table, may also be printed right on the device. If it is necessary to change the number, see the table SCSI ID Numbers for the correct SCSI ID number.

If a system fails to boot, verify that all SCSI devices (hard drives, tape drives, CDROM, etc.) are seen by the system. They should be preset, but occasionally a SCSI device may have the wrong address. See Verify SCSI Devices in Software Commands and Tests.

Shut Down the User Computer

1) On the user computer, log in as `root`
2) Type `halt` (Remember to wait until the system responds with the > sign, or `ok`, indicating the computers are halted.)
3) Press the Test System Power switch and then the Main Power switch on the operator control panel.
4) Depress the power switch on the rear panel of the user computer.

   For the location of the power switch on the SS5, see Connectors on the SS5 Computer in Physical Description of the User Computer.

   For the location of the power switch on the Ultra 1, see Ultra 1 Workstation Connectors in Physical Description of the User Computer.

Disconnect the User Computer

1) Unplug the cables connected to the rear panel of the user computer.

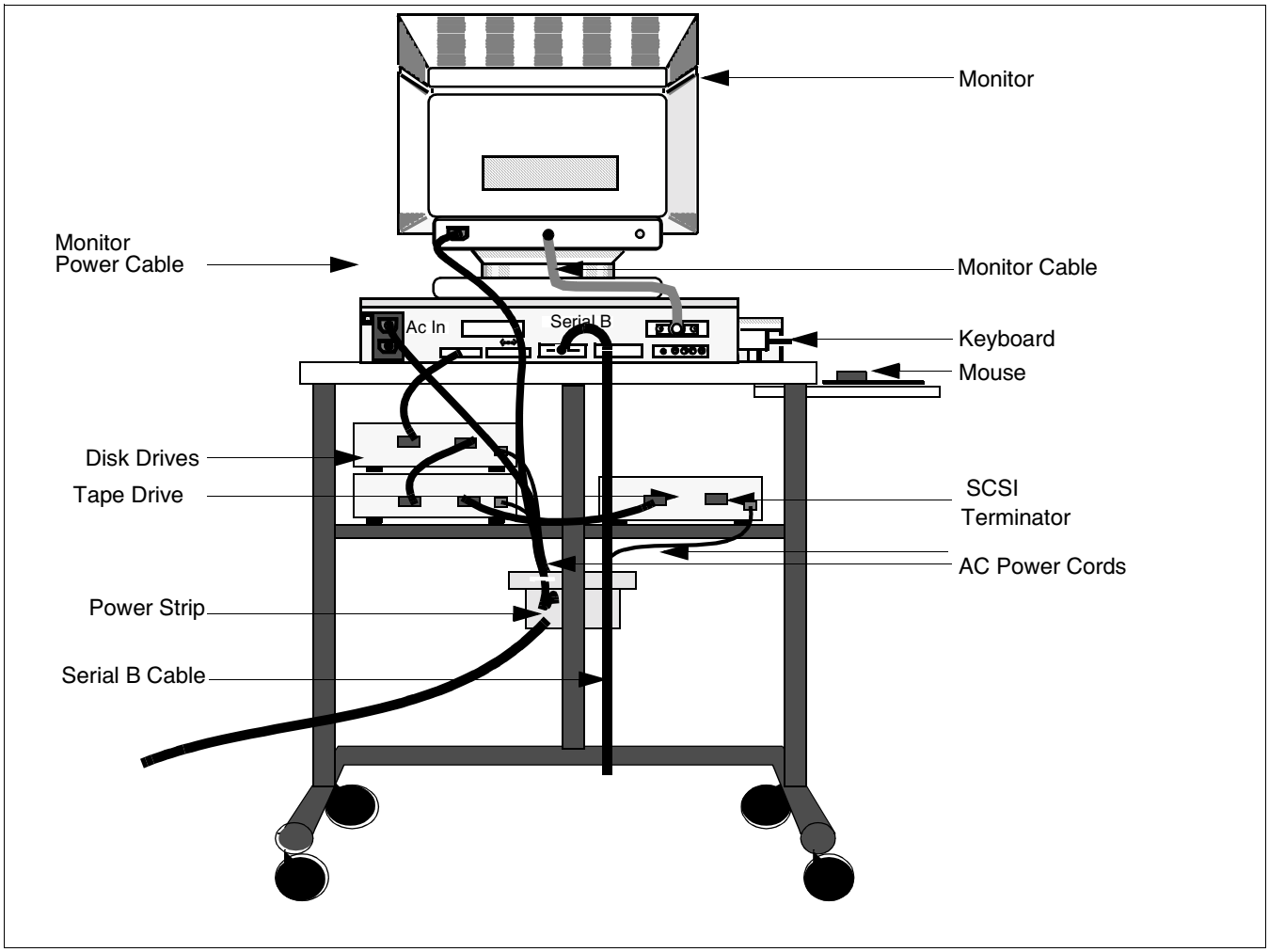
   For the SS5, refer to SS5 Cable List and Rear View of SS5 on Computer Cart. For the cable connections between the SS5 and the test computer system, see the section Types of Configurations in Networking Description.

   For the Ultra 1, refer to Rear View of Ultra 1 on Computer Cart and Ultra 1 Cable List.

SS5 Cable List

Description	PN	From	To
Power Cable, SS5	901-094-00	Power Strip	SS5 Power Connector
SCSI Cable	N/A	SCSI Connector (SS5)	First SCSI Device
Internal Ethernet Cable	804-182-01	Built-in Ethernet Connector(SS5)	Hub

Description	PN	From	To
SS5 Serial Port B Cable	804-189-00	Serial Port B (SS5)	Serial Port A (CPU-24/VTF)
Video Cable	N/A	Monitor connector (SS5)	Monitor
Second Ethernet Cable	804-884-00 or 424-428-20	Second Ethernet connector (SS5)	Customer Net
CPU-24/VTF Port B-E Cable	804-316-00	CPU-24/VTF Serial Port B-E	Bulkhead J7 - J10

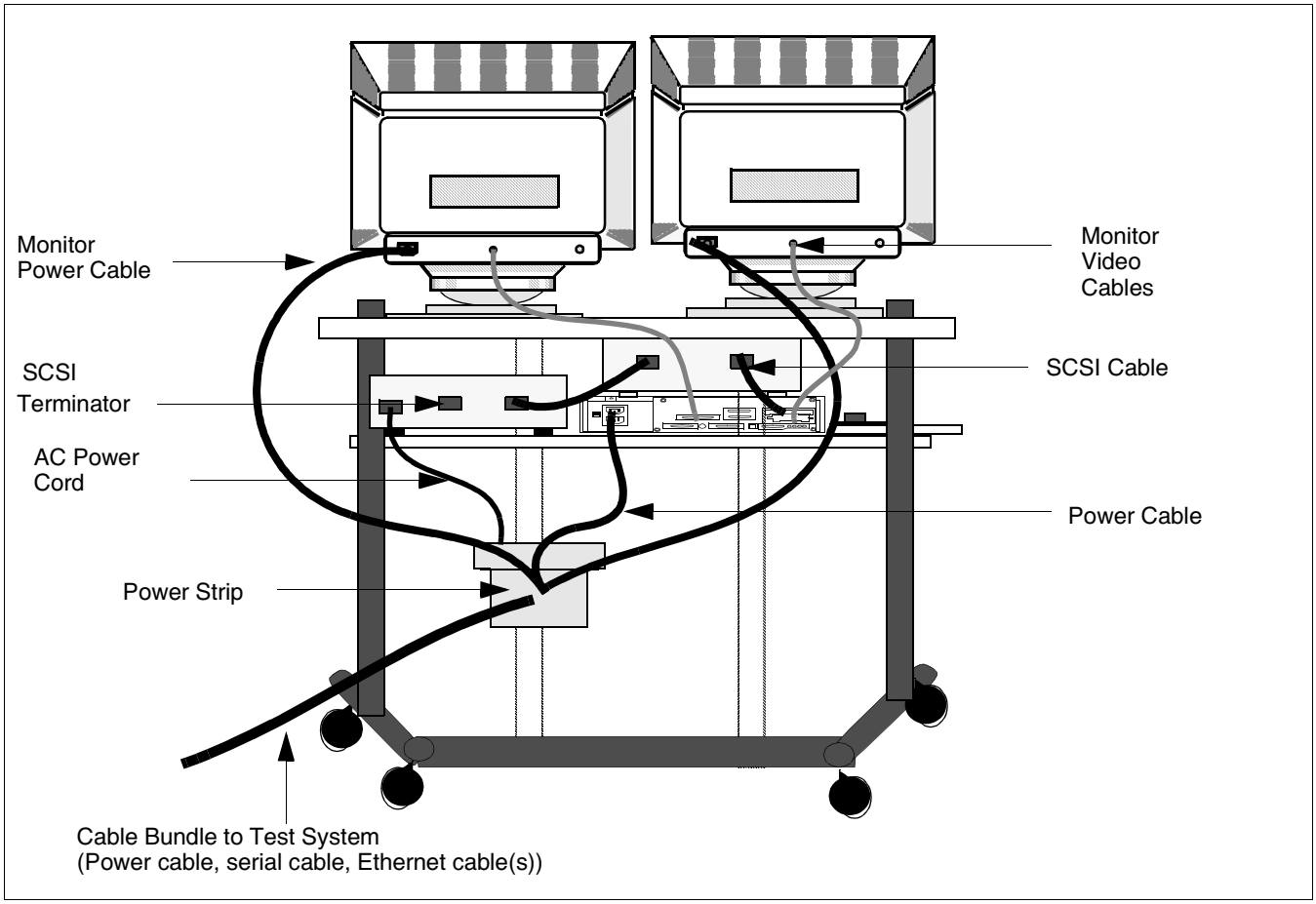


Rear View of SS5 on Computer Cart

Ultra 1 Cable List

Description	PN	From	To
Power Cable, Ultra	901-094-00	Power Strip	Ultra Power Connector
SCSI Cable	Part of Peripheral Kit	Narrow SCSI Connector (Ultra 140)	First SCSI Device
SCSI Cable	807-083-00	Wide SCSI Connector (Ultra 170)	First SCSI Device

Description	PN	From	To
Internal Ethernet Cable	804-182-00	Built-in Ethernet Connector (Ultra)	Hub
Ultra Serial Port B Cable	804-189-00	Serial Port B (Ultra)	Serial Port A (CPU-24/VTF)
Video Cable	N/A	Monitor connector (Ultra)	Monitor
Second Ethernet Cable	804-884-00 or 424-428-20	Second Ethernet connector (Ultra)	Customer Net
CPU-24/VTF Port B-E Cable	804-316-00	CPU-24/VTF Serial Port B-E	Bulkhead J7- J10



Rear View of Ultra 1 on Computer Cart

Open the User Computer

Open the SS5

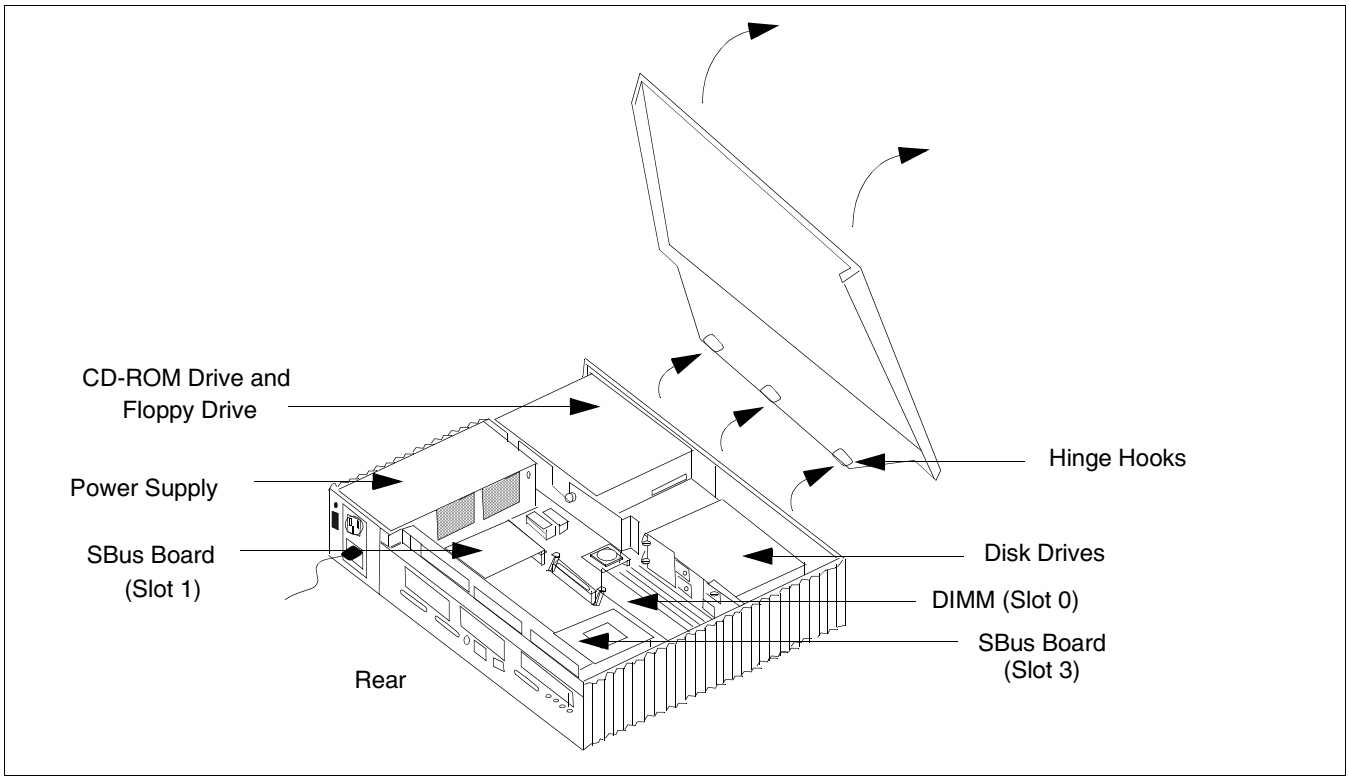
Refer to the figure SS5 Cover while performing these procedures. Before opening the SS5, make sure that the system power and user computer power are off and that the cables are disconnected.

1) Loosen the Phillips-head captive screw on the rear panel. When loosened, the captive screw remains attached to the rear panel.

2) Remove the Phillips-head screw securing the lock block to the cover on the rear panel. Remove the lock block and put it aside.

3) Grasp the back of the cover, lift it up, and then rotate it toward the front of the SS5. When the cover is at a 60 degree angle to the unit, push the cover away from the front panel to free the cover hinge tabs from their slots.

4) Push the cover toward the front about 1/2 inch (13 mm) so the hooks clear the unit. Lift up to remove the cover.



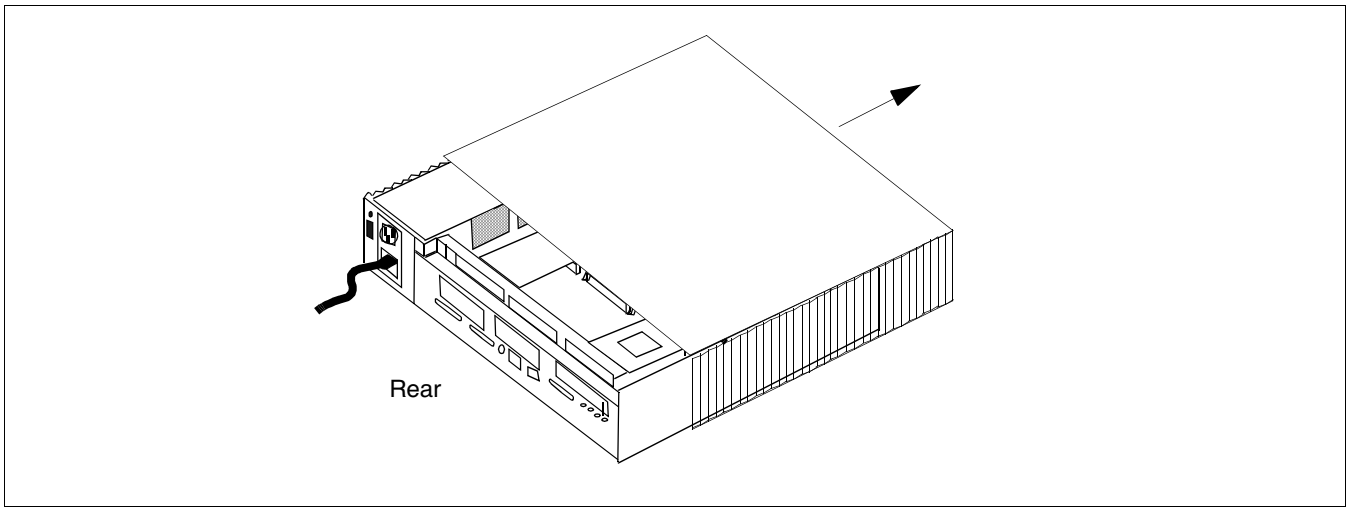
SS5 Cover

Open the Ultra 1

Refer to the figure Ultra 1 Cover while performing these procedures. Before opening the Ultra 1 workstation, make sure that the system power and user computer power are off and that the cables are disconnected.

1) Loosen the two captive Phillips screws and the lock screw on the rear panel.

2) Grasp the cover, lift it straight up to free it first from the rear panel and then from the front panel.



Ultra 1 Cover

Replacing a Power Supply

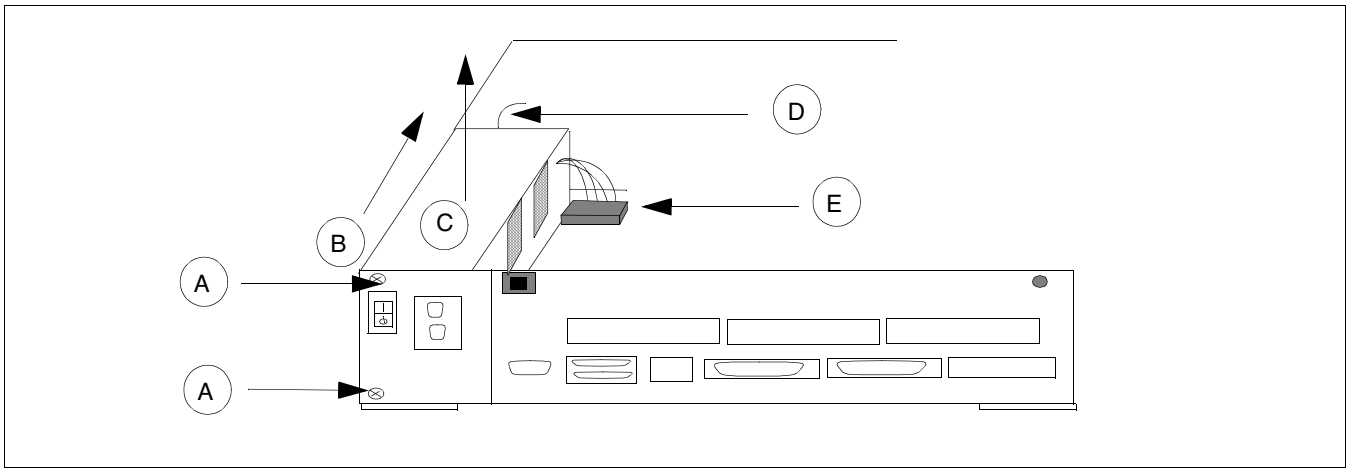
Before replacing the power supply, be sure you have completed the procedures in Preparing to Replace a Component.

! Caution

Do not allow the power supply to touch the processor, as this could damage the processor.

Remove the Power Supply in the SS5

1) Loosen the two screws [A] located on the left side of the SS5's rear panel. See the figure Removing the Power Supply from Chassis.



Removing the Power Supply from Chassis

2) Pull the power supply back slightly [B] so it disengages from the plug and power switch, then pull straight up [C], just enough to clear the sides of the SS5 CPU enclosure. The cables should still be attached to the power supply.

3) Disconnect the cables located at the rear of the power supply. One cable is removed from the rear panel of the power supply [D]. The other cable [E] remains attached to the power supply, but is disconnected from the main CPU board.

4) Go to Install the Power Supply in the SS5.

Install the Power Supply in the SS5

1) Install the replacement power supply by lowering it into place and pushing forward towards the plug and power switch. See Removing the Power Supply from Chassis.

2) Reconnect the cables detached in Step 3 of Remove the Power Supply in the SS5.

3) Tighten the two screws [A] on the left side of the SS5's rear panel. See Removing the Power Supply from Chassis.

4) If you do not need to replace any other components, go to the section Completing the Replacement.

Remove the Power Supply in the Ultra 1

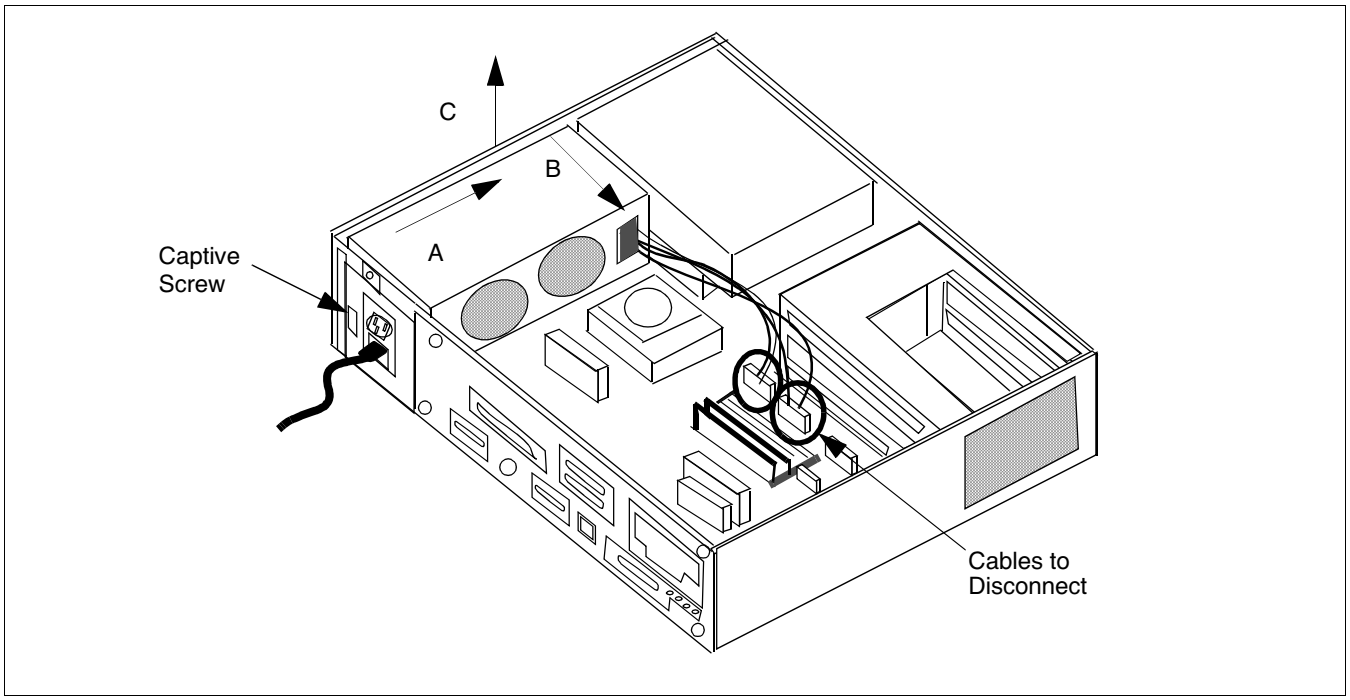
1) Disconnect the cables from the two power connectors, the drive connector, and the audio connector. The location of the connectors are circled in Removing a Power Supply from the Ultra 1.

2) Loosen the captive screw on the rear panel, located beside the power switch.

3) To disengage the power supply from the slots:

- Slide the power supply in the direction of the hard drives [A].
- Carefully tilt the power supply at an angle towards the processor, until it is clear of the side [B].
- Grasp the power supply and lift it up [C].

4) Go to Install the Power Supply in the Ultra 1.



Removing a Power Supply from the Ultra 1

Install the Power Supply in the Ultra 1

1) Install the replacement power supply by lowering it into place and pushing towards the rear of the computer. See Removing a Power Supply from the Ultra 1.
2) Reconnect the cables detached in Step 1 in Remove the Power Supply in the SS5.
3) Tighten the screw on the left side of the Ultra 1's rear panel.
4) If you do not need to replace any other components, go to the section Completing the Replacement.

Replacing a Hard Disk Drive

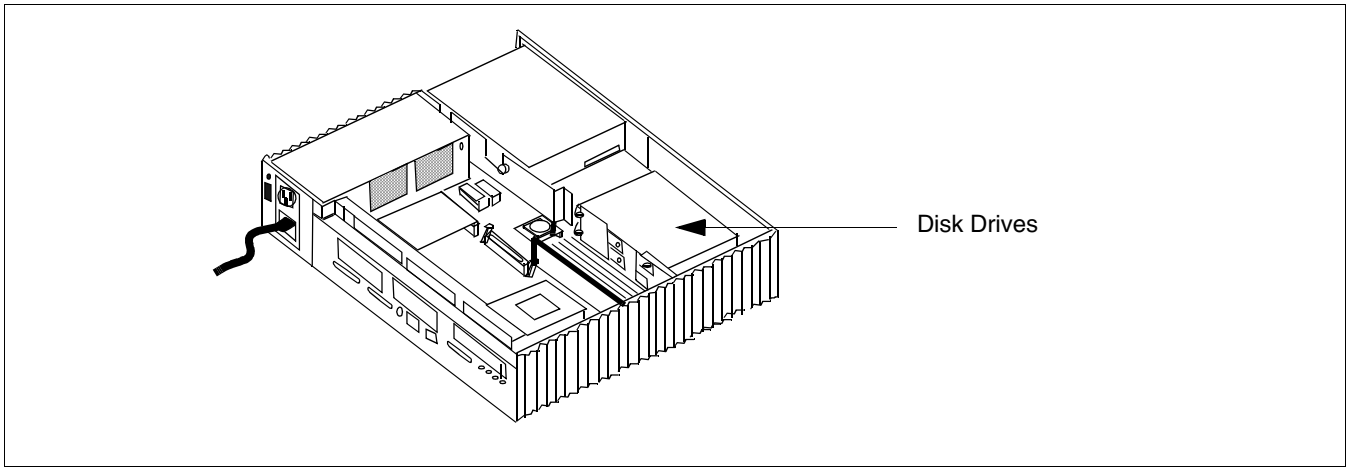
The partitioning of the internal disk drives makes it difficult to replace a disk drive without having to completely reinstall the system software. If a disk drive becomes defective, either back up software or completely reload software from the tape or CD.

In the event that either an internal (standard) drive or an optional external drive fails, and a backup was not performed, information on how to reinstall the software can be found in the Catalyst Software Installation Guide shipped with the system.

Replace a Hard Disk Drive in the SS5

In the standard test system configuration, two internal 2.1 Gbyte disk drives or one 4.3 Gbyte disk drive is installed in the SS5. The second drive is stacked on top of the first drive. See SS5 Hard Disk Drive Location for the location of the internal disk drives. Refer to the Sun Computer manual to install/replace the internal hard disk drive.

The SS5 disk drive (see SS5 Hard Disk Drive Handle) slides into a metal bracket within the CPU. The back end of the disk drive has a built in connector. When the drive is placed into the bracket, the connector automatically mates with the backplane connector of the bracket. See Inserting the Hard Disk Drive in Grooves.



SS5 Hard Disk Drive Location

Before replacing a hard disk drive, be sure you have completed the procedures in Preparing to Replace a Component.

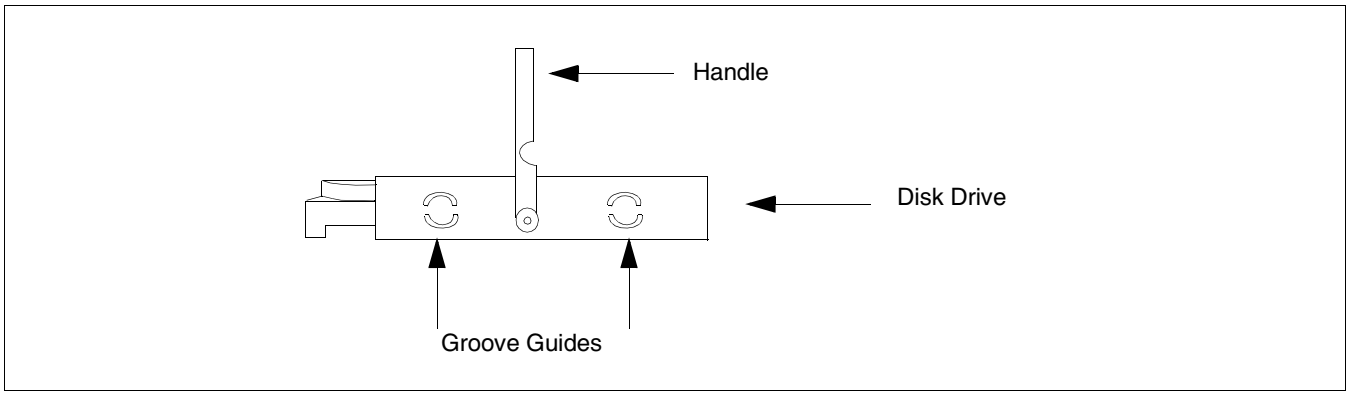
Remove the Hard Disk Drive in the SS5

1) Release the handle from the bracket and put it in an upright position. See the figure SS5 Hard Disk Drive Handle.
2) Using the handle, pull the drive backwards to disengage the drive connector from the backplane and to clear the grooves in the bracket.
3) Lift the drive straight up and out of the CPU.
4) Go to Install the Hard Disk Drive in the SS5.

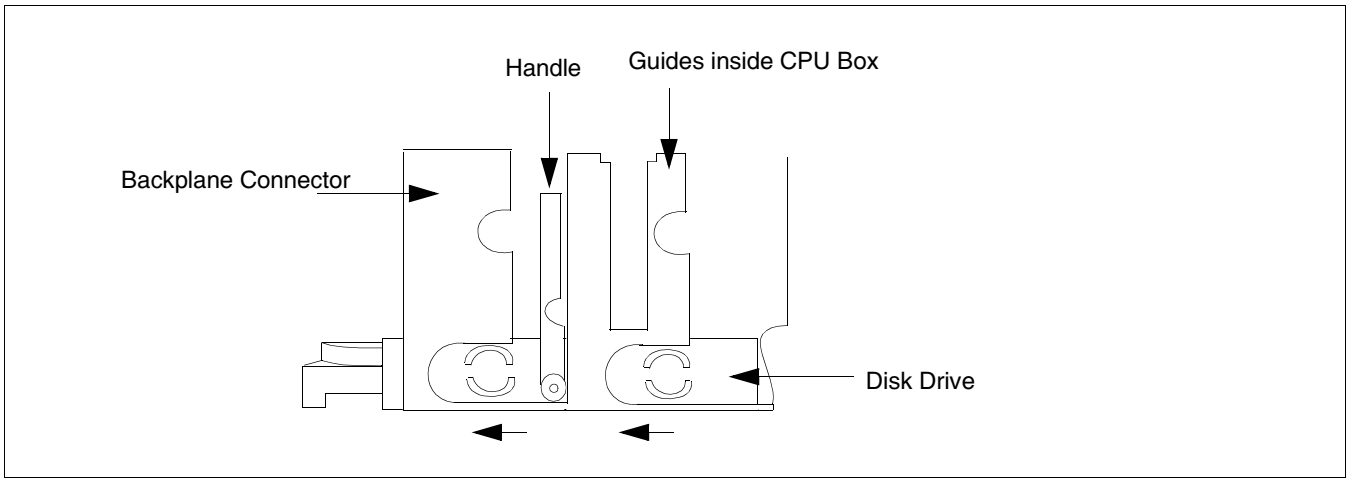
Install the Hard Disk Drive in the SS5

1) Insert the new disk into the bracket, making sure that the groove guides are lined up within the bracket grooves. See the figure Inserting the Hard Disk Drive in Grooves.
2) In one motion, slide the disk drive forward until the connector mates with the backplane connector and pull the handle down until it is locked in place.

3) If you do not need to replace any other components, go to the section Completing the Replacement.



SS5 Hard Disk Drive Handle



Inserting the Hard Disk Drive in Grooves

Replace a Hard Disk Drive in the Ultra 1

Use only hard drives specifically designed for the Ultra 1.

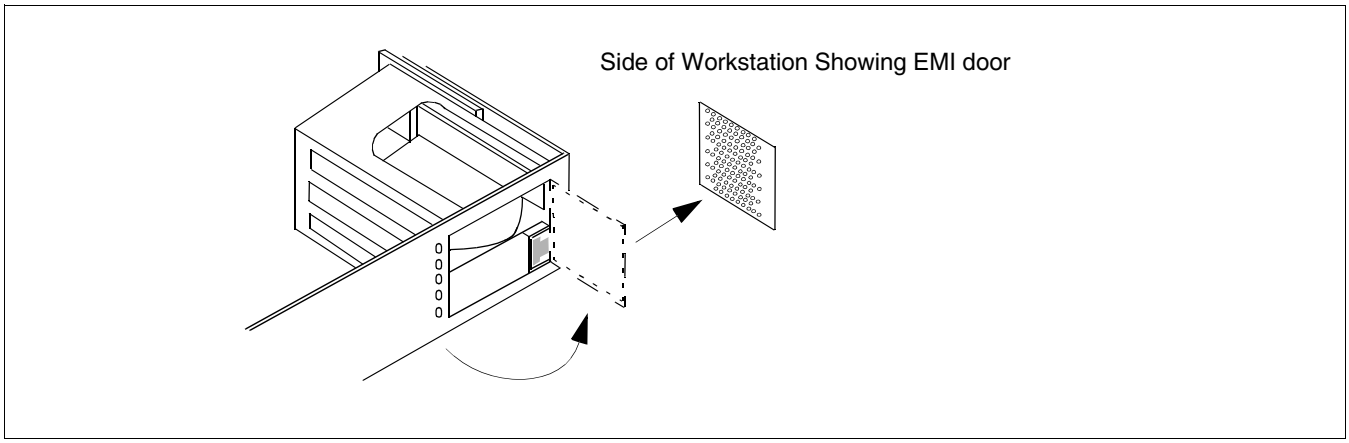
Before replacing a hard disk drive, be sure you have completed the procedures in Preparing to Replace a Component.

Note

SCSI address 0 is assigned to the drive in the bottom position by default, and SCSI address 1 is assigned to the drive in the top position. Make sure that SCSI devices connected to the system do not use the same addresses for internal devices.

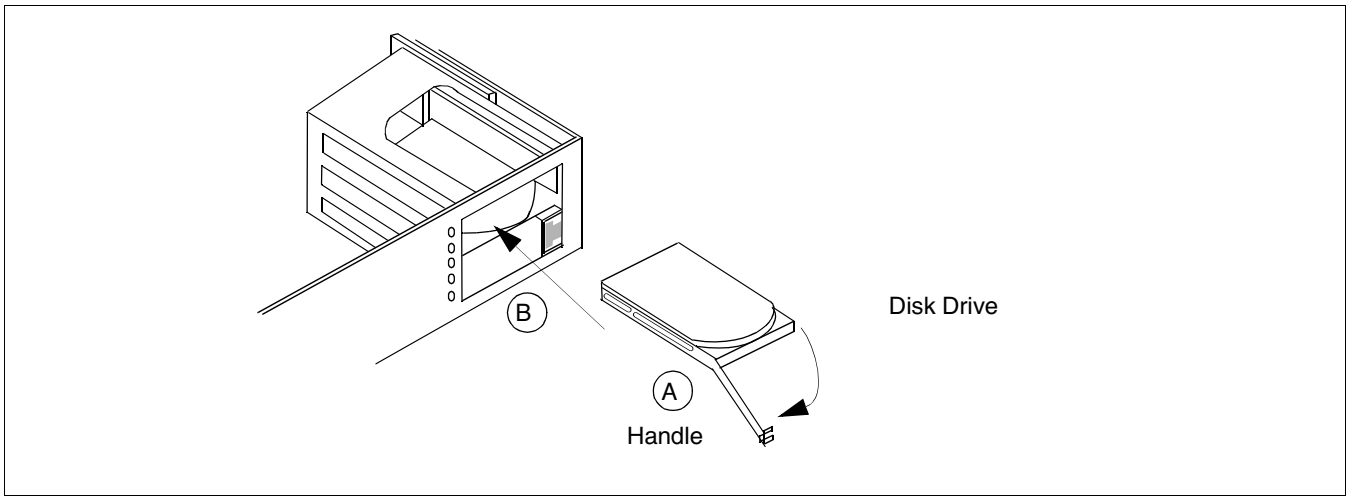
Install the Hard Disk Drive in the Ultra 1

1) Use a screwdriver to remove the EMI door. Refer to Removing the EMI Door.



Removing the EMI Door

2) Remove the hard disk drive from the anti static bag.
3) Open the drive handle [A] and slide the drive completely into the computer chassis [B] (refer to Installing the Drive). Press the drive to connect it to the SCSI port in the system.



Installing the Drive

4) Close the drive handle. The drive handle does not latch unless the drive is installed correctly.
5) Reinstall the EMI door.
6) If you do not need to replace any other components, go to the section Completing the Replacement.

Remove the Hard Disk Drive in the Ultra 1

To remove a hard disk from the Ultra 1, reverse the procedure for installing a hard disk. See Install the Hard Disk Drive in the Ultra 1.

Replacing an Internal Floppy Drive

Before replacing an internal floppy drive, be sure you have completed the procedures in Preparing to Replace a Component.

When installing a drive, please refer to the complete installation instructions in the Sun "Diskette Drive Installation and User's Manual" that is supplied with the floppy drive.

Remove the Floppy Drive in the SS5

1) Remove the CD-ROM filler panel if the CD-ROM is not installed. Remove the CD-ROM if the drive is installed. Refer to Install the CD-ROM Drive in the SS5.
2) Remove the front bezel plate to the floppy drive. See Remove the Internal Floppy Drive in the Ultra 1.
3) Insert a screwdriver into the slots in the SS5 near the rear grommets on the floppy drive. Using the screwdriver as a lever, push the grommets toward the center of the unit to free them. See Replacing Floppy Drive in SS5.
4) Slide the floppy drive away from the side wall (towards the center of the SS5) and lift up slightly.
5) Remove the data and power cables from the drive.
6) Lift the drive out.
7) Go to Install the Floppy Drive in the SS5.

Install the Floppy Drive in the SS5

1) Unplug the SCSI disk cable from the connector on the main CPU board for easier access to the floppy drive data cable. See Replacing Floppy Drive in SS5.
2) Remove the old floppy drive data cable.
3) Route the new floppy drive data cable through the opening and attach it to the floppy drive connector on the CPU board. See Replacing Floppy Drive in SS5.
4) Reconnect the SCSI disk cable to the connector on the main CPU board.
5) Remove the new floppy drive from its packaging and place it on an antistatic bag. Install the four screws and mounting grommets (included in the floppy drive kit) onto the floppy drive. See Replacing Floppy Drive in SS5.
6) Set the floppy drive switch all the way to the right (not all drive models have a switch).

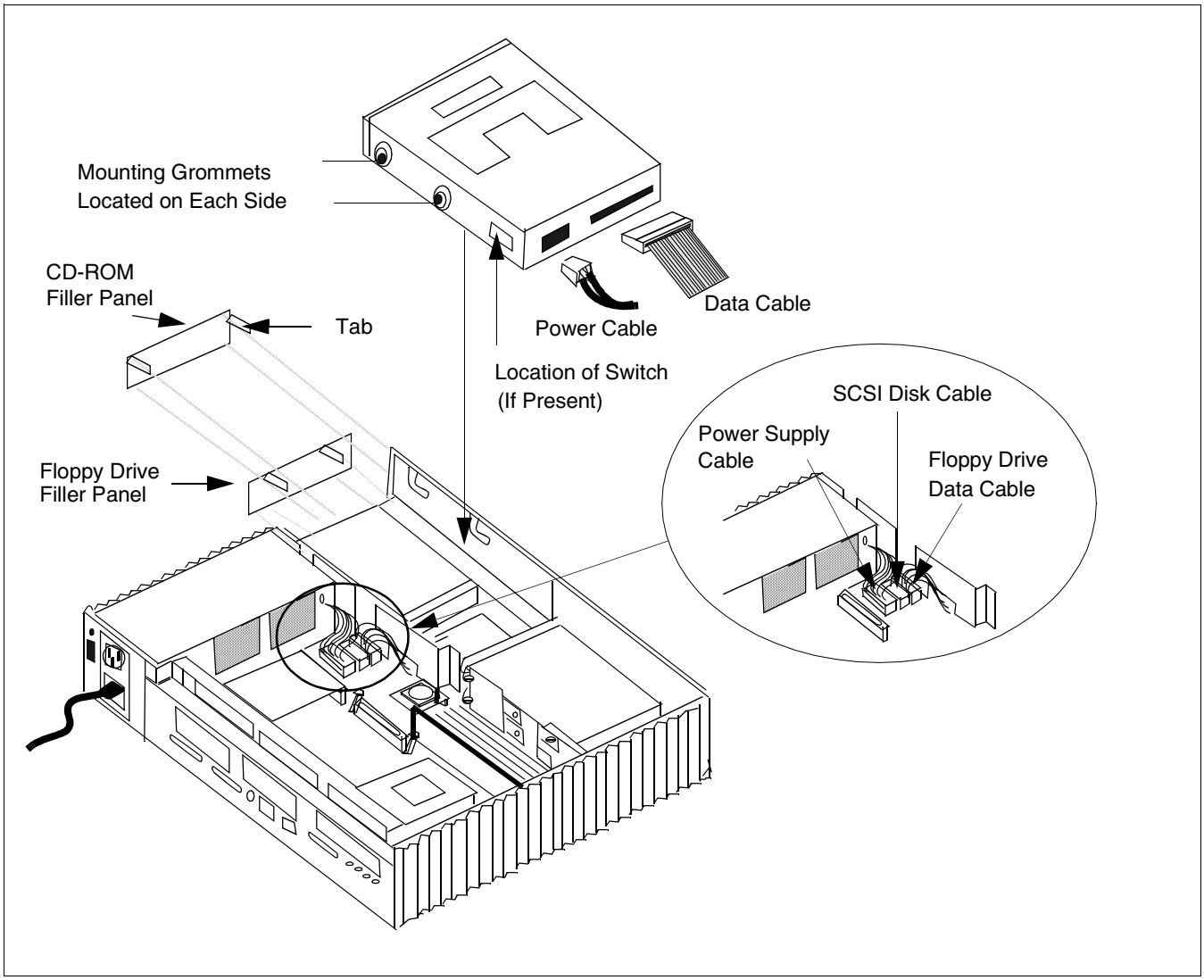
7) Lower the floppy drive into the SS5 but do not seat the drive. Attach the data and power cables to the floppy drive. The straight end of the data cable attaches to the system board. The end that is bent at a 90 degree angle connects to the floppy drive.

8) Slide the floppy drive towards the side wall to lock in the grommets and secure the drive.

9) Replace the drive's front bezel plate.

10) Replace the CD-ROM drive or CD-ROM filler panel.

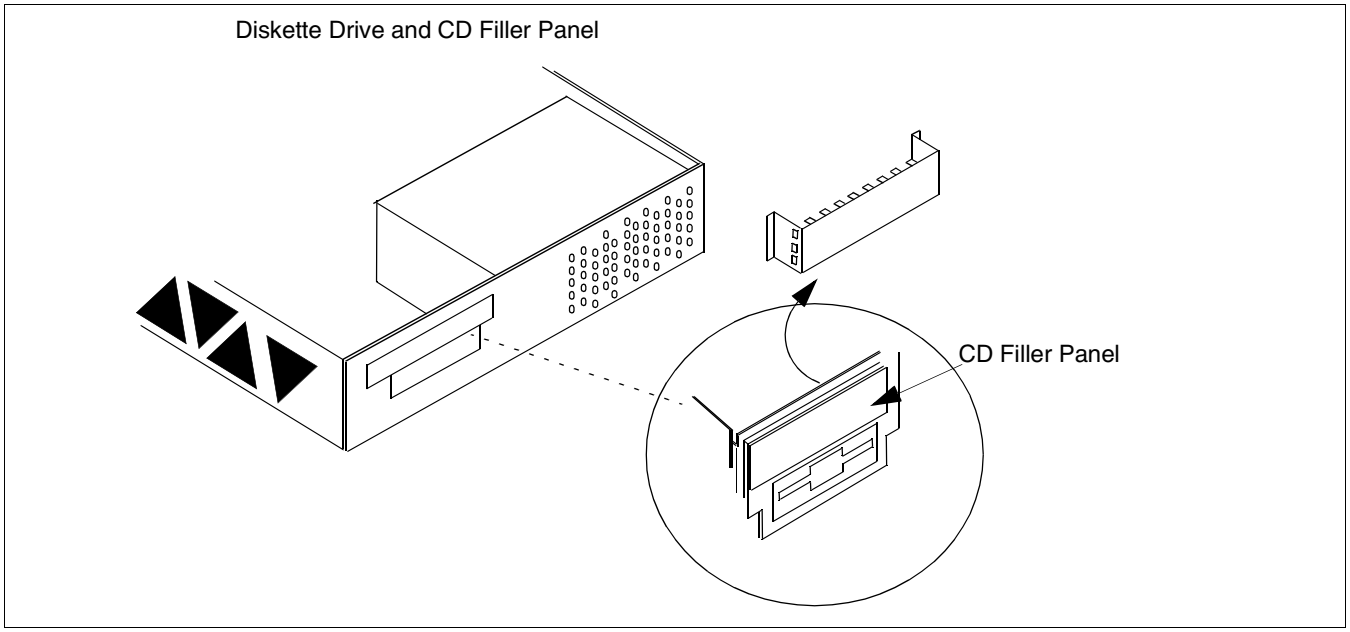
11) If you do not need to replace any other components, go to the section Completing the Replacement.



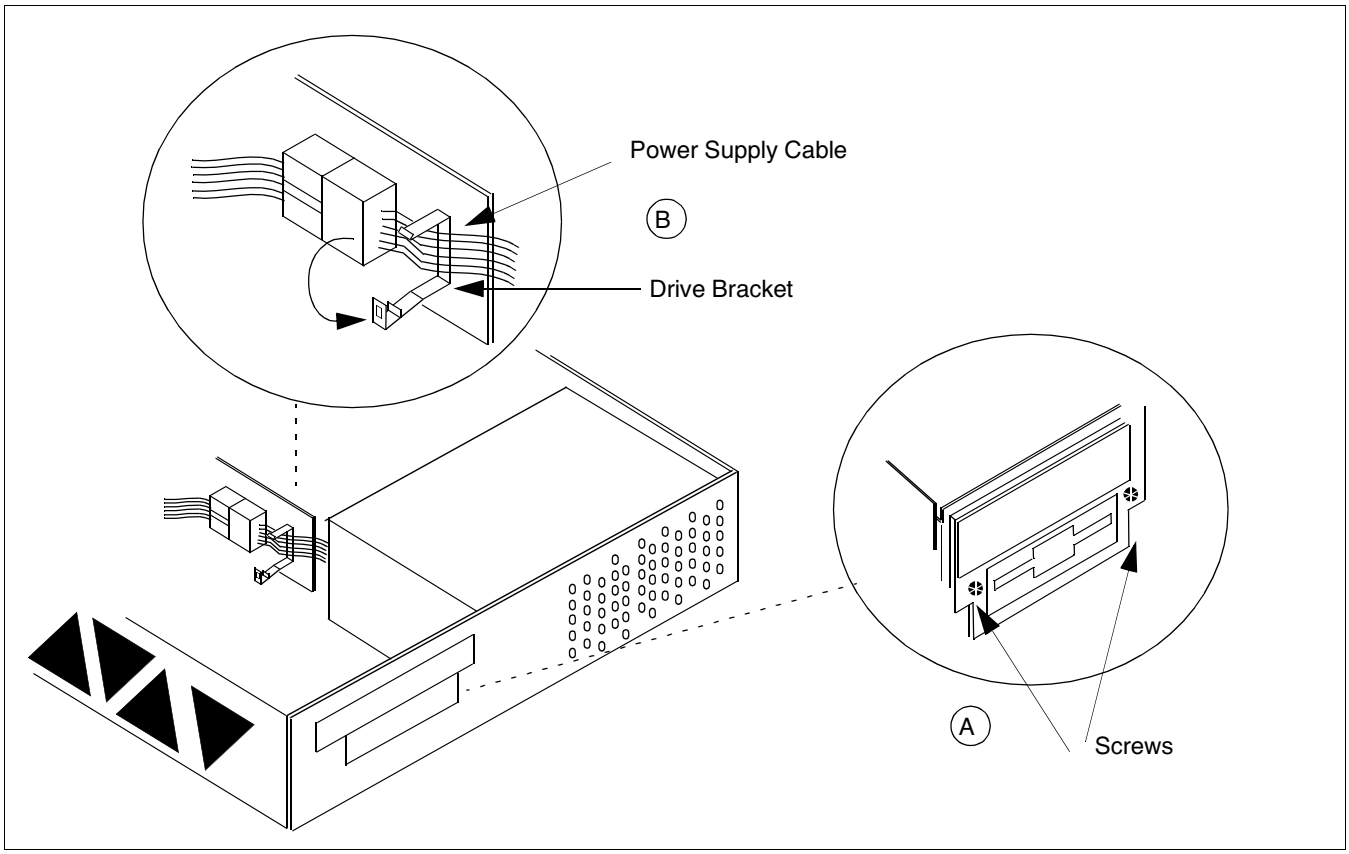
Replacing Floppy Drive in SS5

Remove the Internal Floppy Drive in the Ultra 1

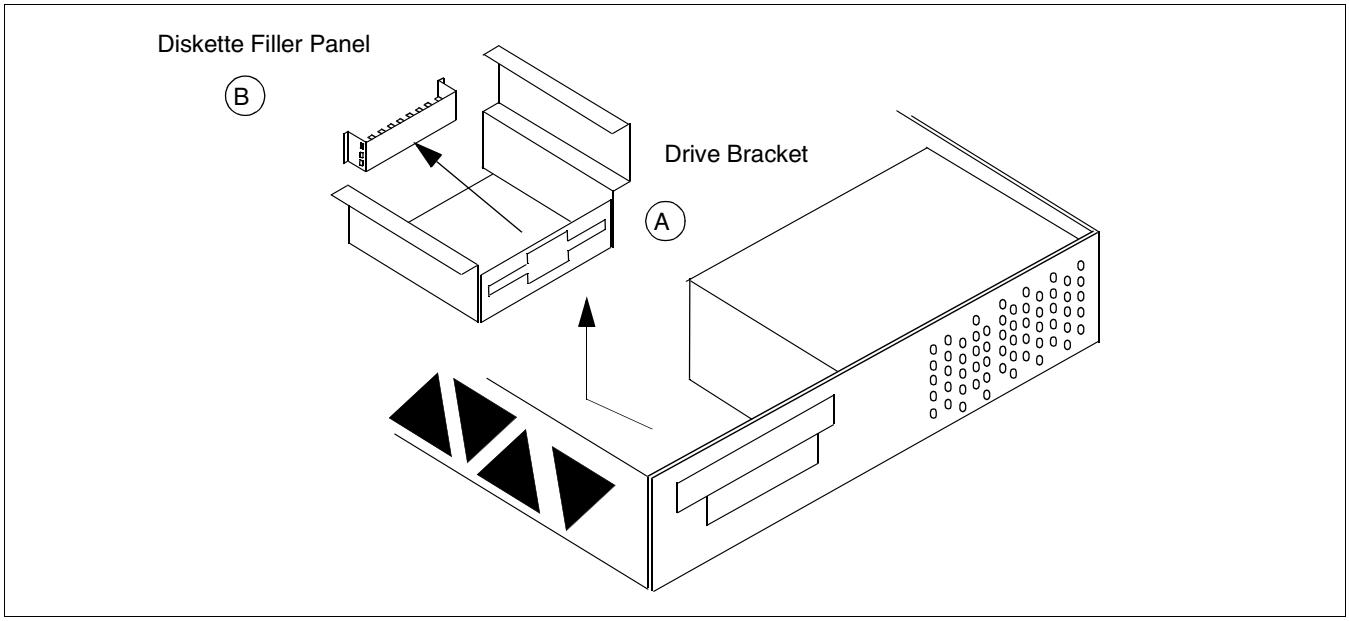
1) Remove the CD filler panel. See Removing CD Filler Panel.
2) Use a Phillips screwdriver to remove the two screws near the opening [A]. Disconnect the power supply cable from the side of the drive bracket [B]. See Disconnect the Power Supply Cable.
3) Slide the drive bracket in, lift it out of the system [A], and remove the diskette filler panel [B]. See Removing the Drive Bracket.
4) Go to Install the Internal Floppy Drive in the Ultra 1.



Removing CD Filler Panel



Disconnect the Power Supply Cable



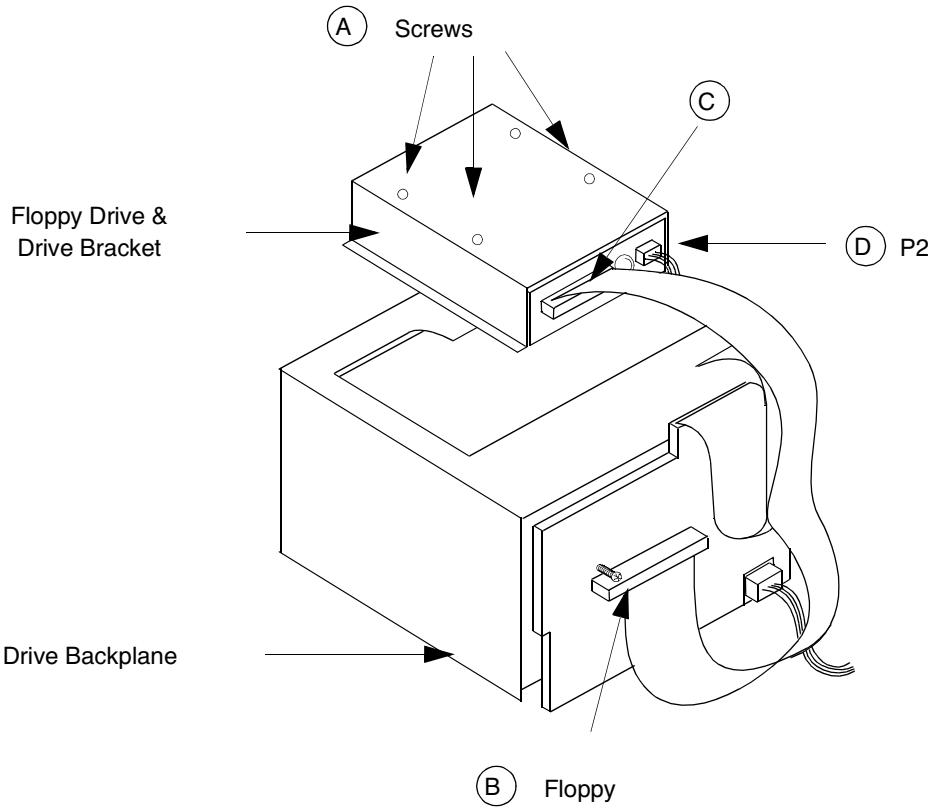
Removing the Drive Bracket

Install the Internal Floppy Drive in the Ultra 1

1) Remove the new floppy drive from the antistatic packaging. Refer to the installation guide that comes with the floppy drive for specific jumper or switch settings.

For steps 2 through 6, see the figure Attaching Cables to the Floppy Drive.

2) Use a Phillips screwdriver to attach the floppy drive to the drive bracket. Attach it using the four screws that are provided [A].
3) Plug one end of the floppy drive data cable the drive backplane marked Floppy [B]. Connect the other end to the diskette drive [C].
4) Attach the connector labeled P2 to the floppy drive [D].
5) Lower the drive bracket into the chassis and slide it toward the opening.
6) Reinstall the two screws that were removed in Step 4 and clip the power supply cable back onto the side of the drive bracket.
7) Reinstall the CD filler panel.
8) If you do not need to replace any other components, go to the section Completing the Replacement.



Attaching Cables to the Floppy Drive

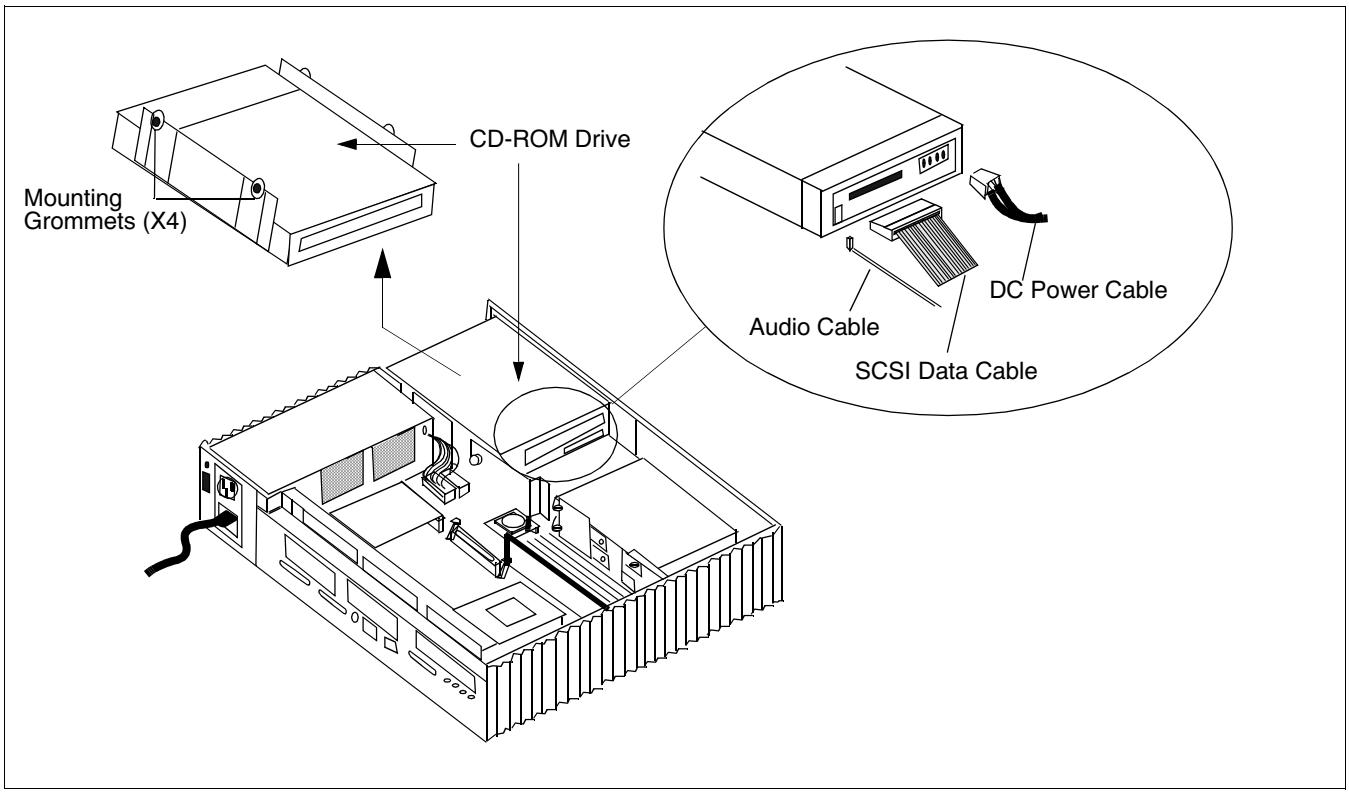
Replacing an Internal CD-ROM Drive

Before replacing an internal CD-ROM drive, be sure you have completed the procedures in Preparing to Replace a Component.

When installing the drive, refer to the complete installation instructions given in the Sun Installation and User's Manual that is supplied with the Sun CD-ROM drive.

Remove the CD-ROM Drive in the SS5

1) Slide the CD-ROM drive towards the side wall to disengage it. See the figure Installation and Cabling of CD-ROM Drive in SS5.
2) Remove the audio, SCSI, and power cables from the drive. Leave these cables plugged into the main CPU board.
3) Lift out the drive.
4) Go to Install the CD-ROM Drive in the SS5.



Installation and Cabling of CD-ROM Drive in SS5

Install the CD-ROM Drive in the SS5

1) If you are not replacing a CD-ROM, remove the CD-ROM filler panel.

   If you are replacing a CD-ROM drive then follow the procedure in Remove the CD-ROM Drive in the SS5.

2) Remove the new drive from the shipping package. The correct bezel, mounting bracket, and mounting grommets are already installed.

3) Make sure the jumpers are installed on pins ID4 and ID2. These two jumpers set the SCSI target address of the drive to 6. All other jumpers except terminator power (Term Power) should be removed (see Jumper Settings for CD-ROM Drive). See Change the SCSI ID Numbers for more information about SCSI IDs.

4) Insert the drive into the system unit by lowering the drive into position and push it towards the center of the system. The grommets should lock into place.

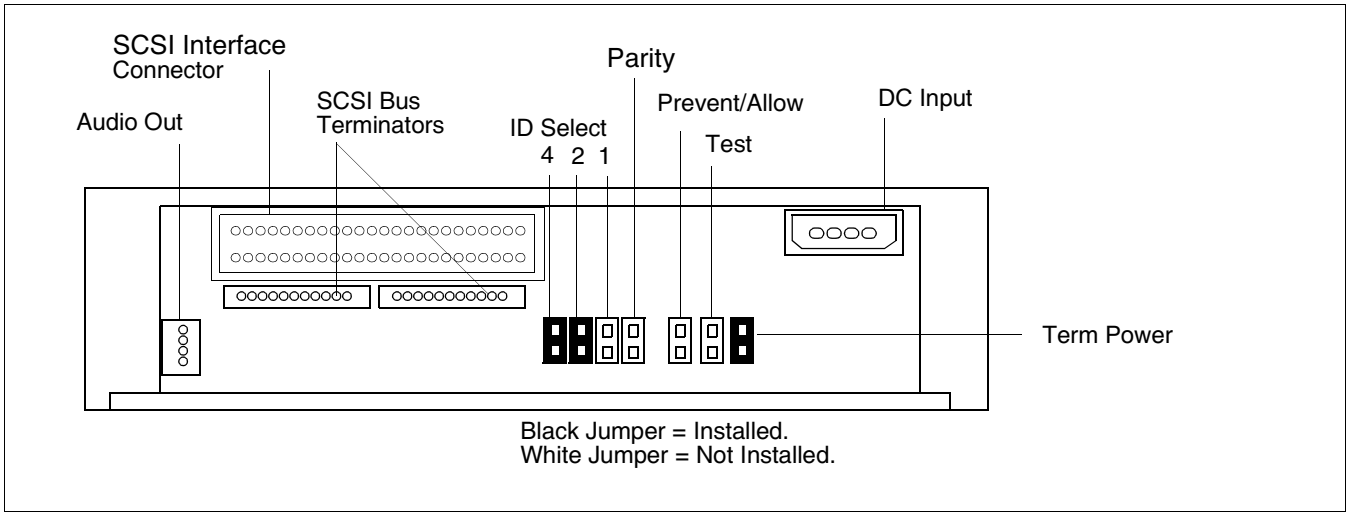
5) Connect the audio, SCSI, and power cables to the drive. See Installation and Cabling of CD-ROM Drive in SS5.

6) Route the audio cable as shown in Audio Cable Routing for the CD-ROM Drive. One end of the cable plugs into the rear of the drive and the other end plugs into J0600 on the SS5 main CPU board.

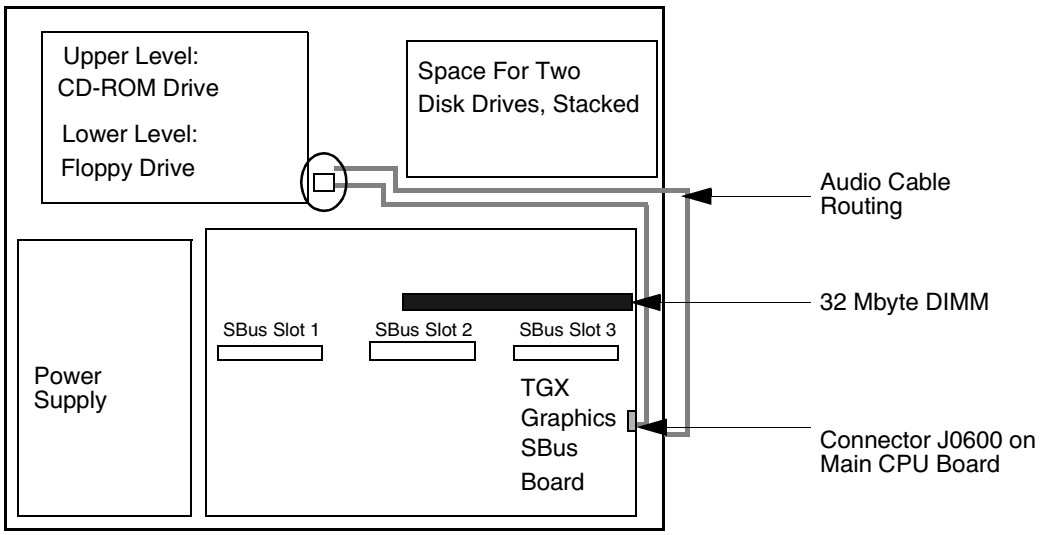
Note

If an SBus board is installed in slot 3, it may be necessary to remove the board in order to see J0600.

7) If you do not need to replace any other components, go to the section Completing the Replacement.



Jumper Settings for CD-ROM Drive



Overhead View of SPARCstation 5

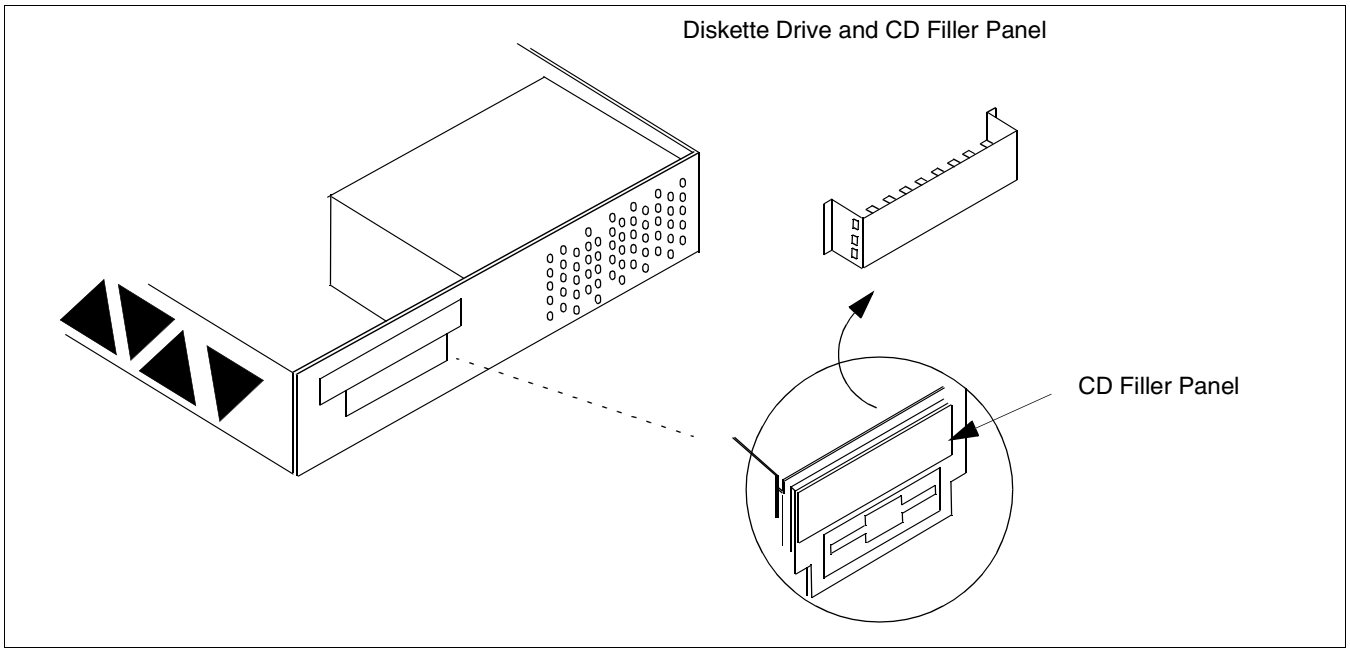
Audio Cable Routing for the CD-ROM Drive

Install the CD-ROM Drive in the Ultra 1

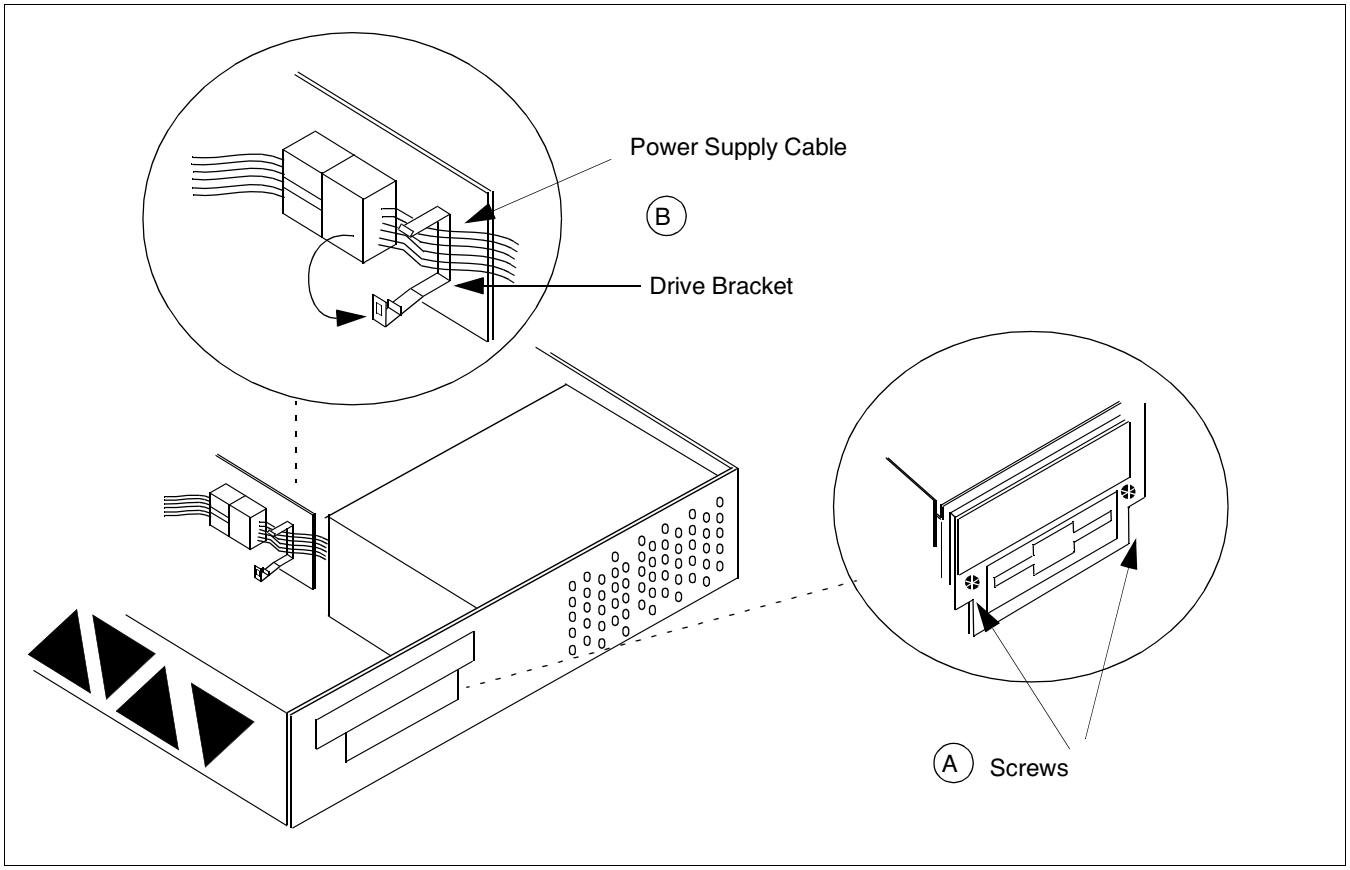
Note

SCSI address 6 must be assigned to the CD ROM drive. Make sure external SCSI devices connected to this system do not use the same addresses used for internal devices.

1) Remove the CD filler panel. See the figure Removing CD Filler Panel.
2) Use a Phillips screwdriver to remove the two screws near the opening [A]. Disconnect the power supply cable from the side of the drive bracket [B]. See the figure Disconnect the Power Supply Cable.



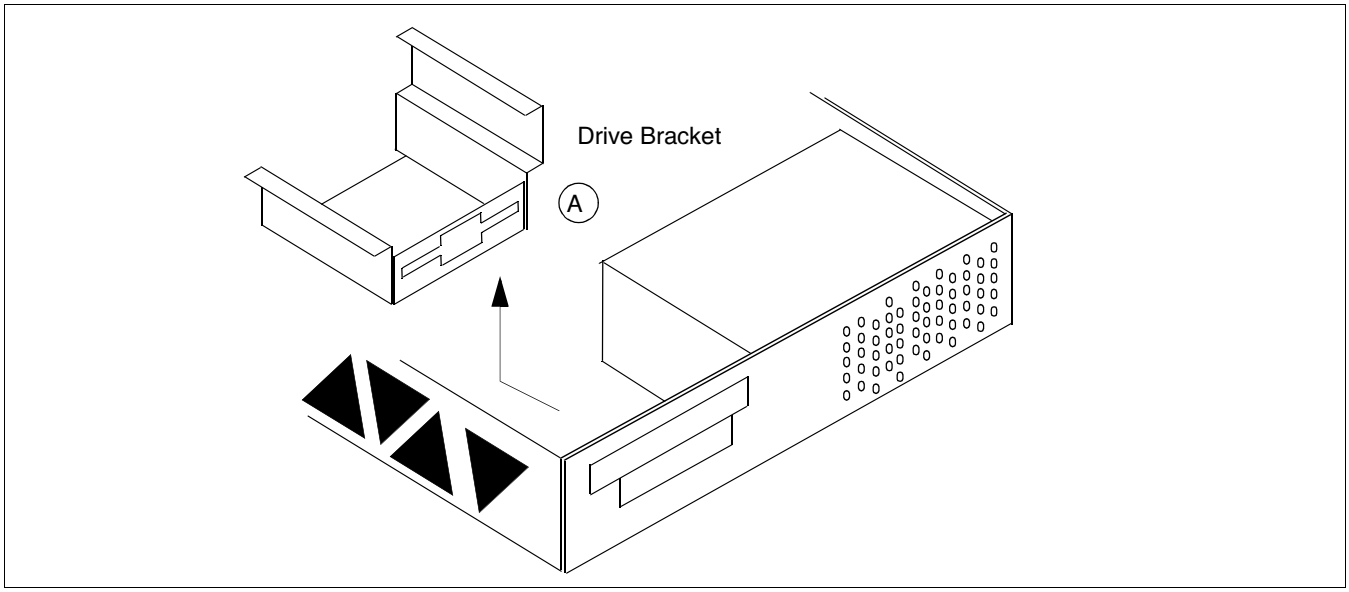
Removing CD Filler Panel



Disconnect the Power Supply Cable

3) Slide the drive bracket in, and lift it out of the system [A]. See the figure Removing the Drive Bracket.

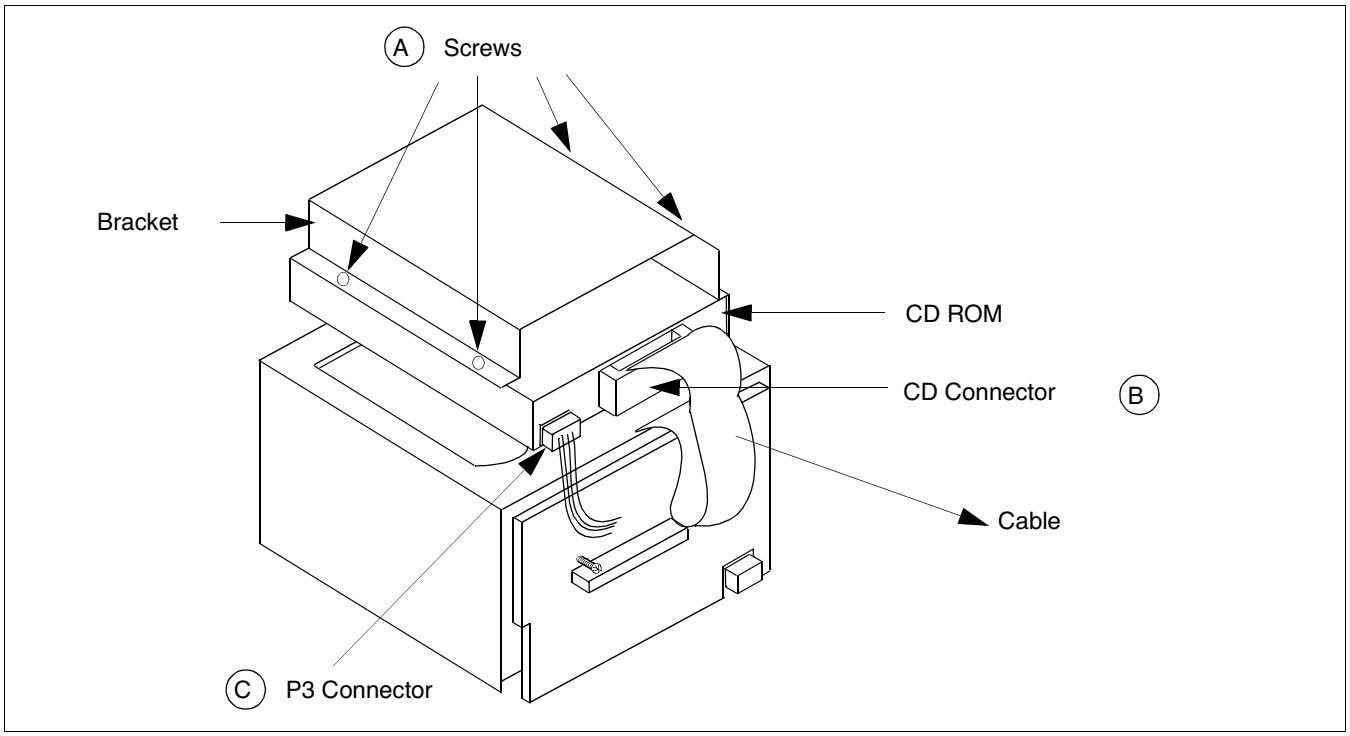
4) Remove the CD-ROM drive from the antistatic bag.



Removing the Drive Bracket

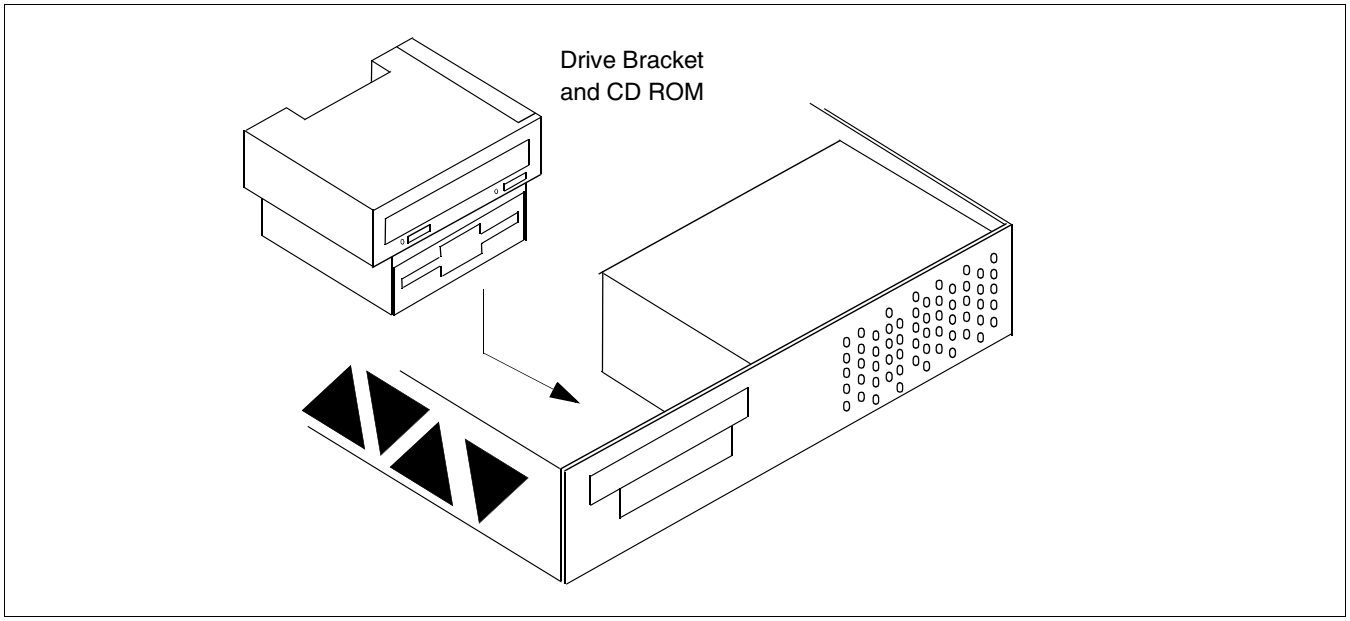
5) Use a Phillips screwdriver to attach the CD-ROM drive to the bracket, using the four (4) screws provided [A].

6) Attach the connector labeled CD [B] and the connector labeled P3 [C] to the drive. See the figure Attaching the CD-ROM Cables.



Attaching the CD-ROM Cables

7) Lower the drive bracket into the chassis and slide it toward the opening. See the figure Installing the CD ROM.



Installing the CD ROM

8) Reinstall the two screws removed in Step 4 and clip the power supply cable back onto the side of the drive bracket.

9) If you do not need to replace any other components, go to the section Completing the Replacement.

Replacing Memory

When additional DIMMs are installed, the user must update the boot PROM so that the additional memory is tested during the power-on self-test (POST) routine. This must be done even though the SS5 recognizes the additional memory and displays the new total in the banner message that appears on the screen after a power cycling or a reset command. See the section Update the Boot PROM.

Note

The DIMMs for the SS5 and Ultra user computers are not interchangeable.

Before replacing memory, be sure you have completed the procedures in Preparing to Replace a Component.

Install Memory in the SS5 or the Ultra 1

The procedure for installing memory is the same for both the SS5 and the Ultra 1 user computer. The SS5 user computer comes with two 32 Mbyte DIMM installed. The Ultra 1 workstation comes with 128 Mbyte of memory installed.

Note

The initial 32 Mbyte DIMM must be installed in slot 0. Additional DIMMs must be installed in pairs and in the lowest numbered consecutive slot available.

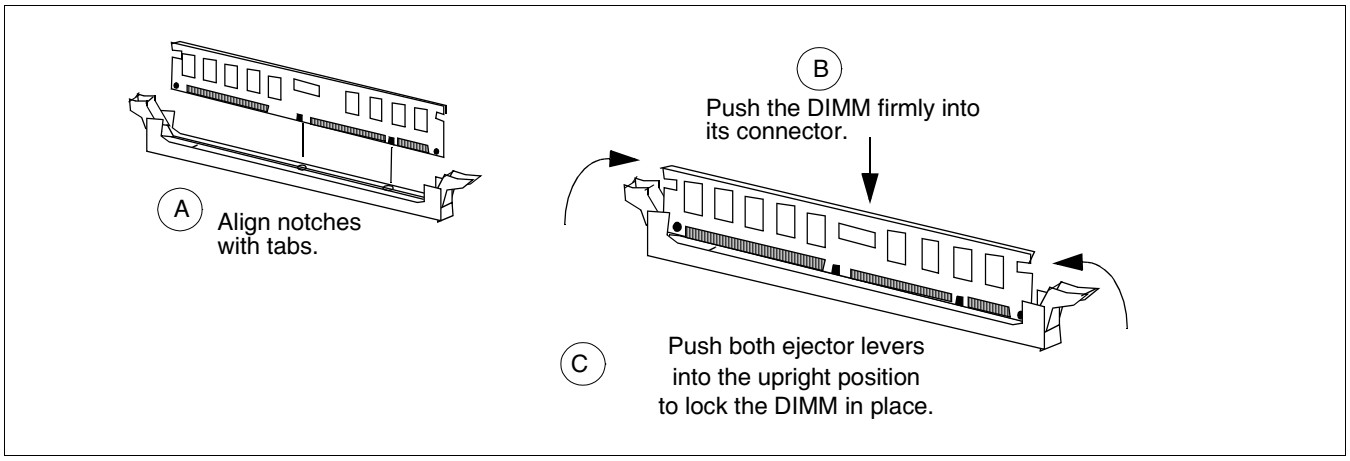
1) Locate the DIMM slots in the computer Slot 0, the slot closest to the rear panel, must contain a DIMM.

   For The SS5, see the figure Internal Component Locations in the SS5 in Physical Description of the User Computer.

   For the Ultra 1, see Internal Component Locations in the Ultra 1 Series in Physical Description of the User Computer.

Refer to the figure Installing the DIMM for steps 2 through 4.

2) Install the additional DIMM in the lowest numbered consecutive slot. Align the notches in the 32 Mbyte DIMMs with the tabs in the connector [A]. The DIMMs are keyed and can only be mounted one way.
3) Place thumbs on opposite corners and with a firm push seat the DIMM [B]. When properly seated, the DIMM snaps into place.
4) Lock the DIMM in place by pushing both ejector levers into the upright position [C]. DIMMs that are seated correctly are level with the other installed DIMMs.
5) Go to Update the Boot PROM.



Installing the DIMM

Update the Boot PROM

If additional DIMMs were installed, the boot prom must be updated so that the additional memory is tested during POST. If the banner displays an incorrect amount of memory then the DIMMs may need to be reinstalled or could be defective.

1) After installing memory and any additional components, go to the section Completing the Replacement.
2) Verify that the initial banner message displays the correct amount of installed memory.

! Caution

Do not press the L1-a keys during the boot process or disk corruption could occur.

3) Immediately following the banner, the word `Testing` appears. Press L1-A (press the L1 or STOP key in the top left of the keyboard and the A key simultaneously).

   The user computer displays: `ok` (type `help` for a list of commands).
4) Type `setenv selftest-#megs XX`

   [XX is the number of total megabytes installed (32, 64, 96, etc.)].
5) Type `printenv`

   Locate the line beginning with `selftest-#megs` and verify that the change was properly entered.
6) Type `reset` to reboot the user computer. Additional memory is tested on reboot.

Replacing SBus Boards

Before replacing SBus boards, be sure you have completed the procedures in Preparing to Replace a Component.

Install SBus Boards in the SS5

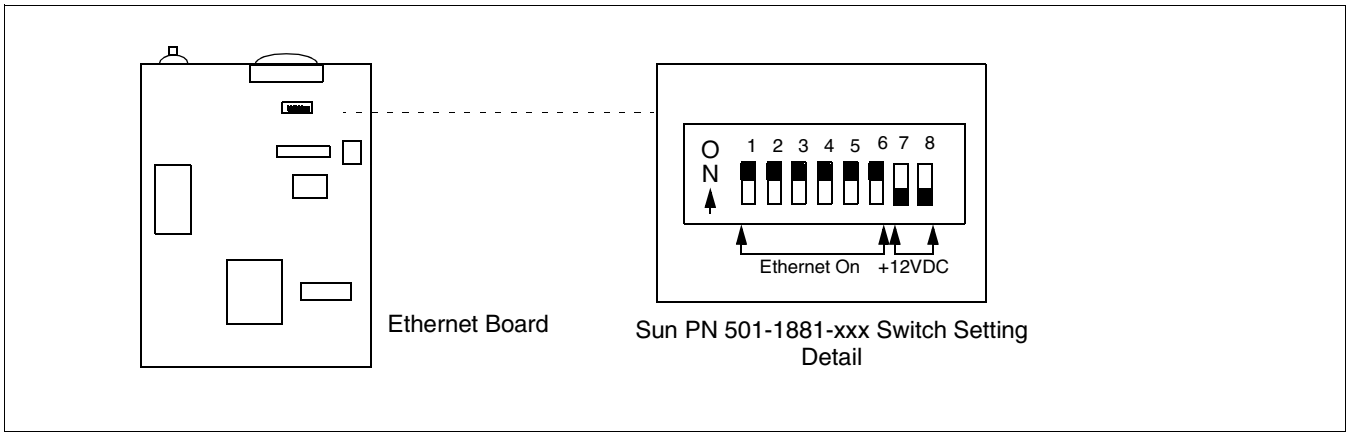
The SS5 computer has three SBus expansion slots. Slot 1 is used for a second Ethernet controller board. Slot 2 is not used. Slot 3 holds the TGX graphics board. See SS5 Internal Components - Top View in Physical Description of the User Computer.

There are two types of Ethernet boards used in the system: AUI (pn 425-346-00) or 10/100 Base-T (pn 425-407-00).

There are two versions of the Sun AUI board. Both boards function identically if the DIP switches are set as follows:

- Sun pn 501-1450-XXXX DIP switches 1 through 8 OFF
- Sun pn 501-1881-XXXX DIP switches 1 through 6 OFF, switches 7 and 8 ON

Also verify that the +12VDC switch is set to use the standard Ethernet 15 pin connector on the edge of the board. Ethernet Board Switches shows the switch's location on the Ethernet board.



Ethernet Board Switches

1) Locate the SBus connector (or slot) for installation of the SBus board in the bottom of the SS5. Teradyne installs the second Sun Ethernet controller board in SBus slot 1. See SS5 Internal Components - Top View in Physical Description of the User Computer.
2) Remove the SBus slot filler panel from the bottom of the panel by lifting up on the clips at the bottom of the panel. Pull the panel toward the front of the system. An SBus card extractor comes installed on all SBus card field replaceable units.

3) Hold the board at an angle to the rear panel, insert the tabs on the board's backplate into the corresponding slots on the rear panel. See Installing an SBus Board in the SS5 Computer.

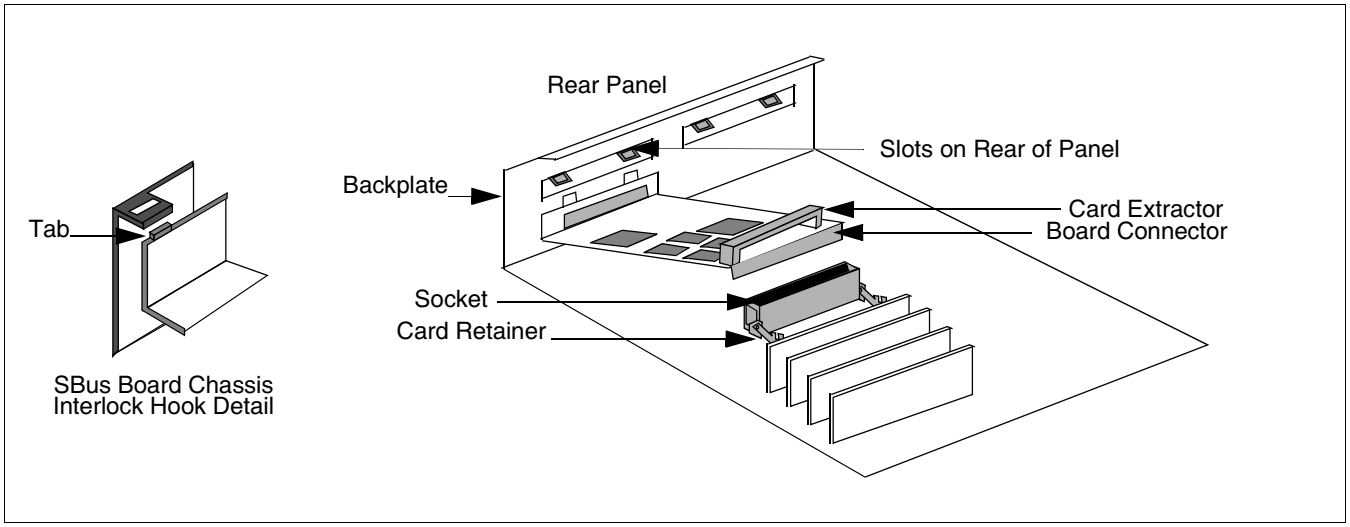
4) Align the SBus board connector with the socket on the system board. Gently press on the corners of the SBus board to insert the connector into the socket.

   To avoid damaging the board's pins don't force the board into the socket.

5) Push the two card retainers forward to clamp down the SBus board.

6) If you do not need to replace any other components, go to the section Completing the Replacement.

   The SBus board is recognized and tested automatically during POST. Refer to the section POST in Software Commands and Tests for more information.



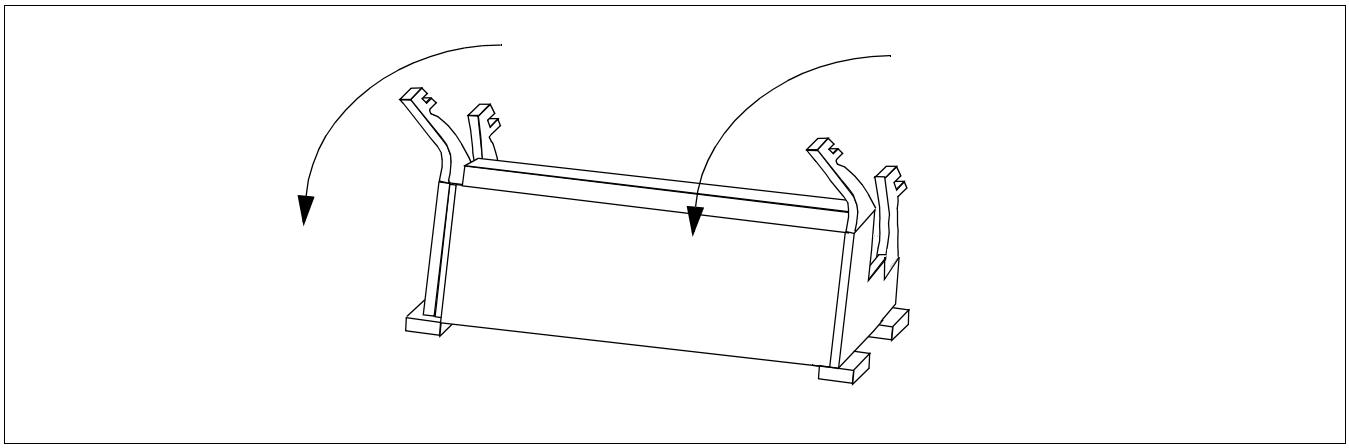
Installing an SBus Board in the SS5 Computer

Install Sbus Boards in the Ultra 1

The Ultra 1 computer has three expansion slots. Two slots are Sbus slots used for the Ethernet controller board and graphic card. One slot is a UPA and is used for a second graphics card (Creator Graphic Card). See Internal Component Locations in the Ultra 1 Series in Physical Description of the User Computer for the location of these slots.

1) Identify the appropriate Sbus slot and open the Sbus card retainers.

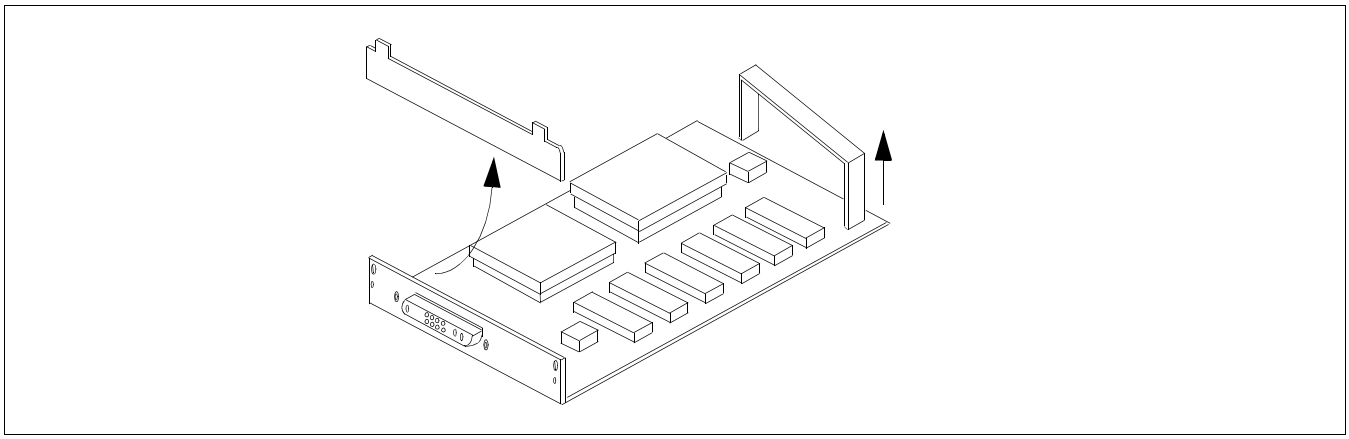
2) If a graphics card is not present, use both hands to grasp the tabs at the base of the Sbus filler panel. Squeeze the tabs until the base of the panel is disengaged from the chassis. Swing the base towards the rear to remove it. See the figure Sbus Card Retainer.



Sbus Card Retainer

3) Holding the Sbus card by the edge, unpack it and place it on an antistatic surface. If required, set the jumpers or switches on the card.

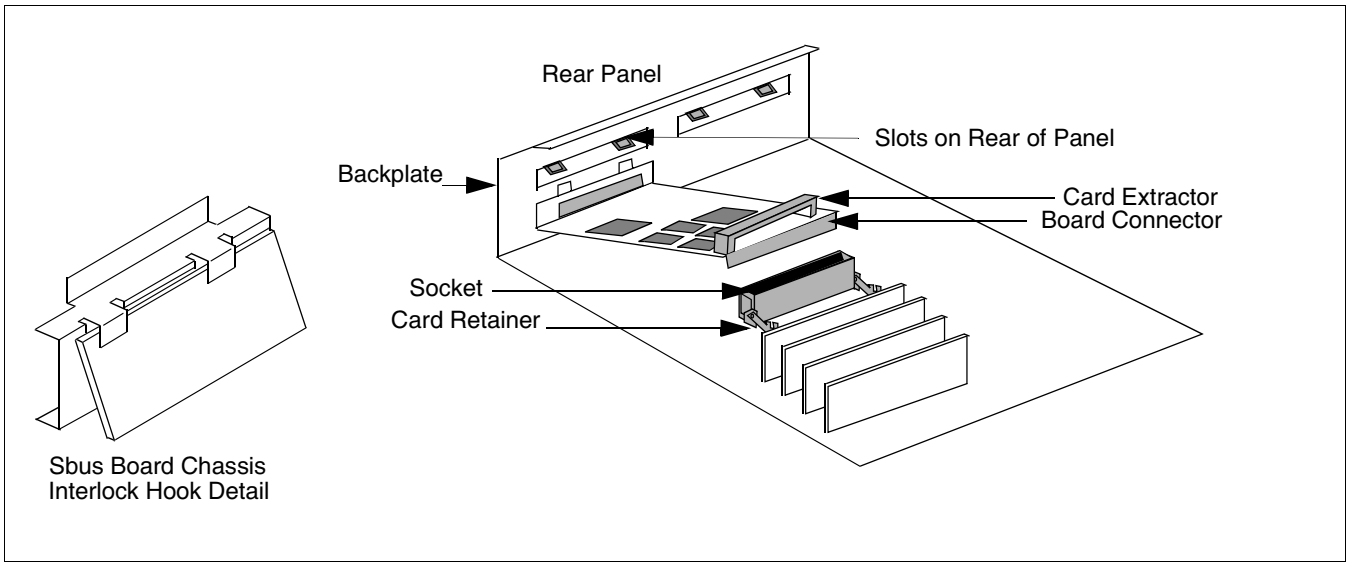
4) Remove the Sbus card extractor handle by bending one leg slightly to the outside until the hook clears the hole in the Sbus card. See the figure Removing the Sbus Extractor Handle.



Removing the Sbus Extractor Handle

5) Holding the card at an angle, insert the card backplate behind the tabs at the top of the Sbus opening. Lower the card into position. Carefully press the corners of the card to push it into the connector. Do not force the card as the pins on the connector could be damaged. See the figure Inserting the Sbus Board Into Position.

6) If you do not need to replace any other components, go to the section Completing the Replacement.



Inserting the Sbus Board Into Position

Replacing a Motherboard

Before replacing a motherboard, be sure you have completed the procedures in Preparing to Replace a Component.

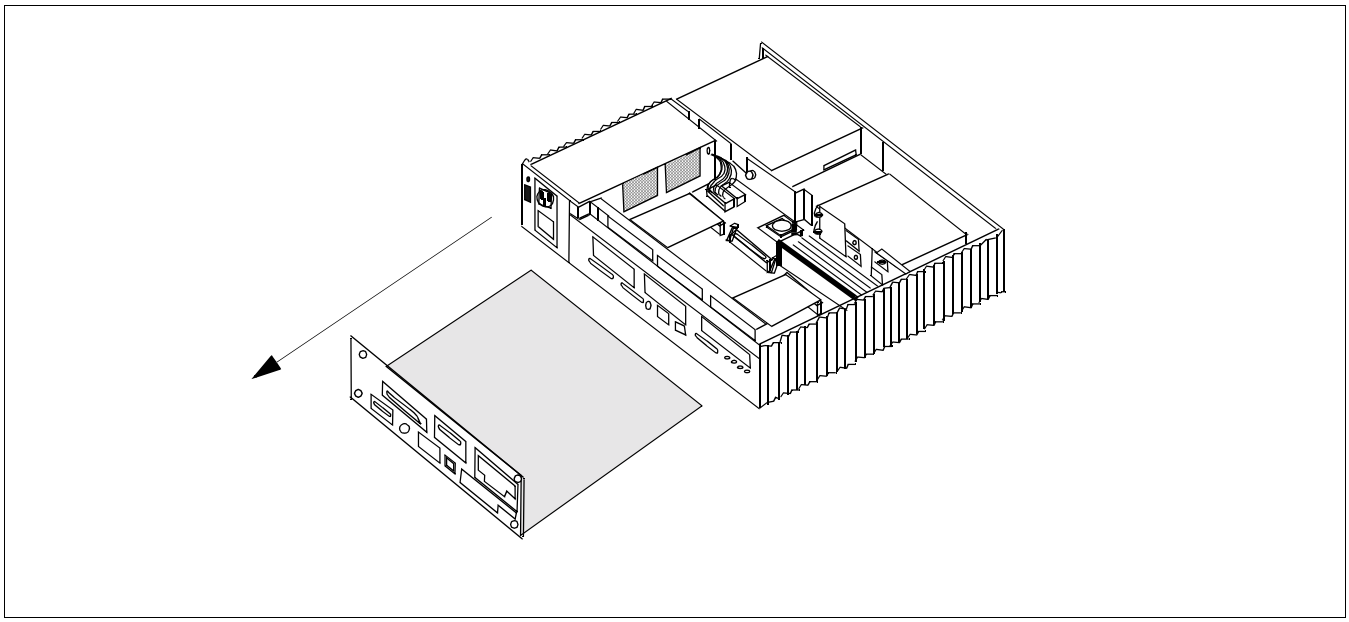
Remove the Motherboard in the SS5

1) Loosen the two bottom captive screws at the right and left corners. See the figure Removing the Motherboard in the SS5.
2) Disconnect the power, SCSI, and audio cables (if present).
3) Grasp the rear panel with the motherboard attached, and slide it forward along the slide rails located in the computer case.

   Do not remove the rear panel of the motherboard when replacing the board.
4) Go to Install the Motherboard in the SS5.

Install the Motherboard in the SS5

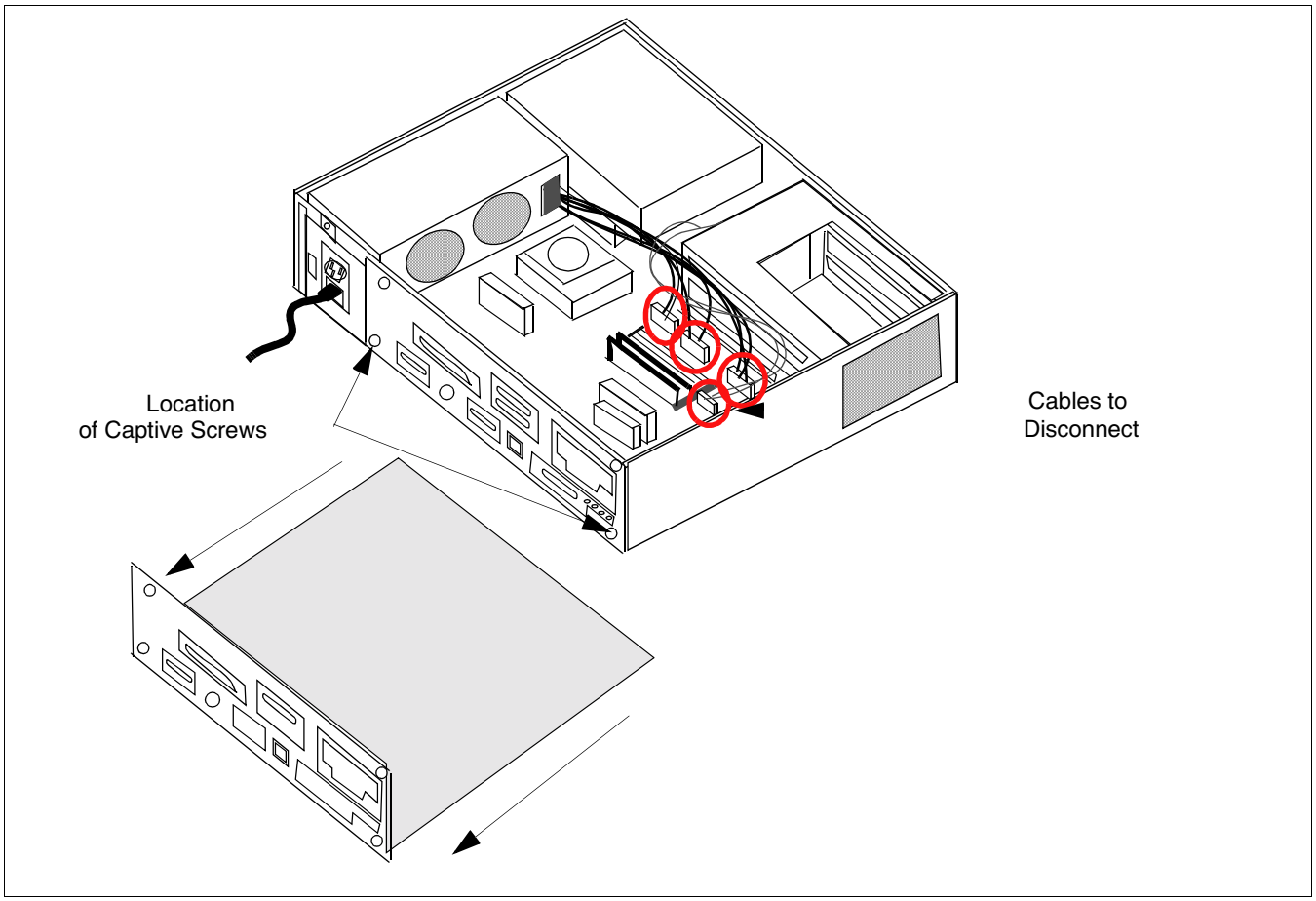
1) Insert the new motherboard.
2) Reconnect the cables.
3) Tighten the captive screws.
4) If you do not need to replace any other components, go to the section Completing the Replacement.



Removing the Motherboard in the SS5

Remove the Motherboard in the Ultra 1

1) Loosen the two bottom captive screws at the right and left corners. See the figure Removing the Motherboard in the Ultra 1.
2) Disconnect the cables at the connectors circled in Removing the Motherboard in the Ultra 1.
3) Grasp the rear panel with the motherboard attached, and slide it forward along the slide rails located in the computer case.
4) Go to Install the Motherboard in the Ultra 1.



Removing the Motherboard in the Ultra 1

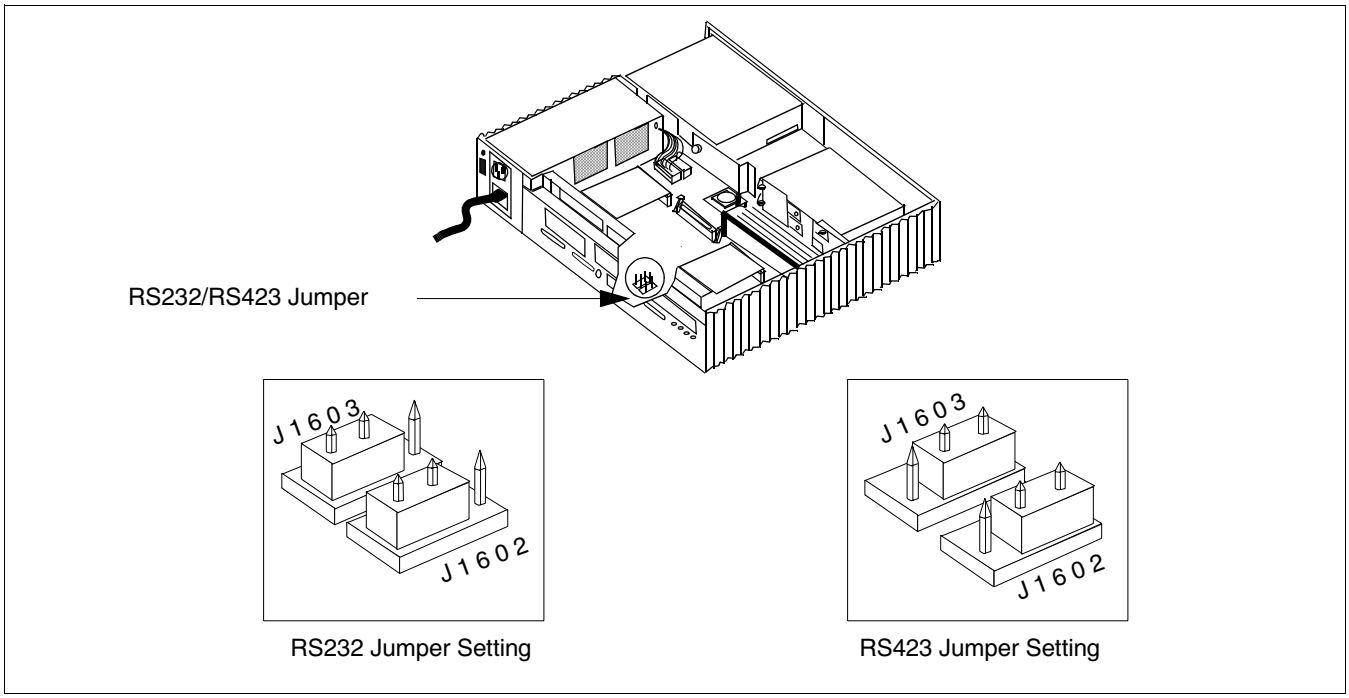
Install the Motherboard in the Ultra 1

1) To install the new motherboard, grasp the rear panel and slide it into the computer case.
2) Reconnect cables disconnected in Step 2 of Remove the Motherboard in the Ultra 1.
3) If you do not need to replace any other components, go to the section Completing the Replacement.

Verifying/Changing the RS232/423 Jumpers

The RS232/423 jumpers connect the user computer to the test computer. If the system was shipped from the factory in RS-432 mode, the jumpers need to be set to RS232 mode. See Location and Setting of the RS232/RS423 Jumper in the SS5 and Location and Setting the RS232/RS423 Jumpers in the Ultra 1 for the location and jumper settings.

Before verifying and changing the RS232/432 jumpers, be sure you have completed the procedures in Preparing to Replace a Component.

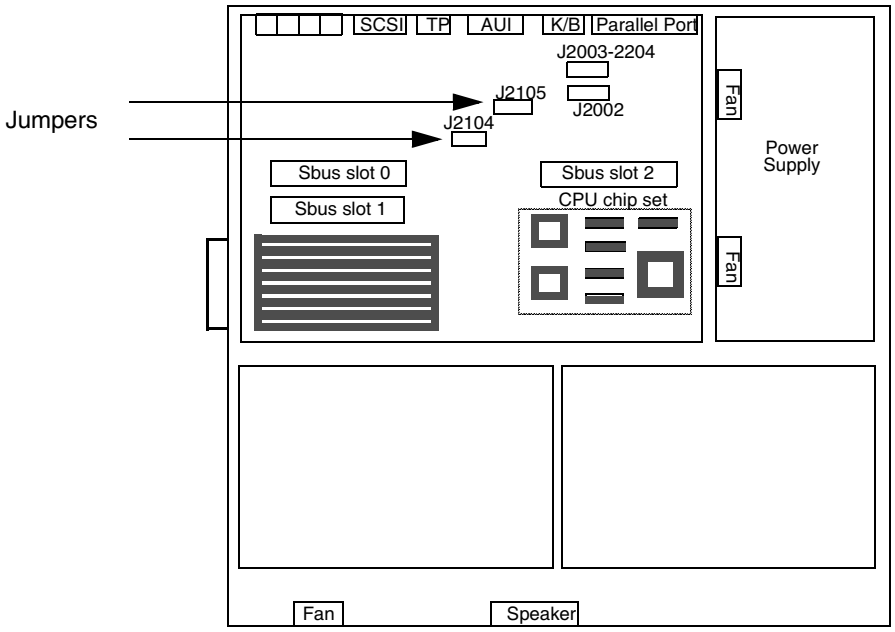


Location and Setting of the RS232/RS423 Jumper in the SS5

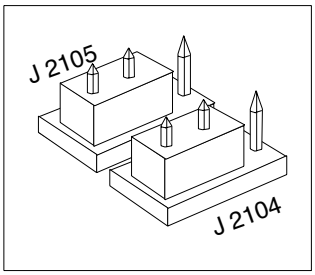
1) In the SS5, you must remove the graphics card to view the RS-423/232 jumper. To do this, reverse the procedure described in the section, Install SBus Boards in the SS5.
2) If necessary, change the jumper settings.

   For the SS5, see the figure Location and Setting of the RS232/RS423 Jumper in the SS5.

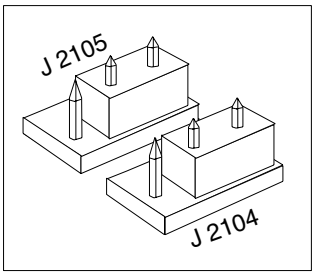
   For the Ultra 1, see Location and Setting the RS232/RS423 Jumpers in the Ultra 1.
3) In the SS5, replace the graphics card.
4) If you do not need to replace any other components, go to the section Completing the Replacement.



Ultra 1 - Top View



RS232 Jumper Setting



RS423 Jumper Setting

Location and Setting the RS232/RS423 Jumpers in the Ultra 1

Completing the Replacement

Perform the following procedures after replacing a component in the user computer.

Note

Anytime the system computer configuration changes (aside from swapping one part for an identical part), you must reconfigure Solaris 2. See Reconfigure the Solaris 2 System in Software Commands and Tests for this procedure.

1) Close the user computer.

   For the SS5, refer to Close the SS5.

   For the Ultra 1, refer to Close the Ultra 1.

2) Reconnect the cables to the rear panel of the user computer.

   For the SS5, refer to SS5 Cable List and Rear View of SS5 on Computer Cart. For the cable connections between the SS5 and the test computer system, see the section Types of Configurations in Networking Description.

   For the Ultra 1, refer to Rear View of Ultra 1 on Computer Cart and Ultra 1 Cable List

3) Restart the system. For detailed procedures, refer to the following sections in Software Commands and Tests:

   • Restarting the System.
   • Boot the User Computer.
   • Reconfigure the Solaris 2 System.

Close the User Computer

Close the SS5

1) Hold the cover at a 60 degree angle to the system and guide the three cover hinge hooks into the corresponding slots in the front of the SS5. See the figure SS5 Cover. Then slowly lower the cover making sure that the hinge hooks remain inserted into their slots.
2) Tighten the captive Phillips-head screw in the upper right hand corner of the rear panel.
3) Reinstall the lock block. Be careful not to overtighten the screw.

Close the Ultra 1

1) Align the cover to the front of the system.
2) Lower the cover onto the chassis. Align the grooves located on the rear of the cover to the matching channels located at the rear of the chassis. See the figure Ultra 1 Cover.
3) Press down on the back of the cover to fully seat it on the chassis.
4) Tighten the captive Phillips-head screw in the upper right hand corner of the rear panel.
5) Reinstall the lock block. Be careful not to overtighten the screw.

Overview

The Ultra 5 (PN 425-423-02), Ultra 10 (425-470-00), and Ultra 60 (425-483-00) ship with documentation from Sun Microsystems. Teradyne recommends following Sun procedures, therefore, this chapter provides a guide to that documentation. This chapter contains the following sections:

- Preparing to Replace a Component
- Using the Sun Multimedia Documentation
- Completing the Replacement

Preparing to Replace a Component

Prior to replacing a component, perform the following procedures to prepare the computer for servicing.

Checklist for Servicing the Ultra 5/10/60 Computer

The Servicing the Ultra 5, Ultra 10, or Ultra 60 (Computer Checklist is a list of the replacement procedures for several components of the Ultra 5, 10 and 60 computer. Print this checklist to help keep track of servicing procedures.

Checklist for Servicing the Ultra 5, Ultra 10 or Ultra 60 Computer

➨	Procedure
Prepare the System	
	Prepare the Computer for Servicing
	Disconnect the Ultra 5/10/60 Cables
	Remove the Test Computer (Ultra 10/60)
Replace User Computer Components	
	Replacing a Power Supply
	Replacing a Hard Disk Drive
	Replacing an Internal Floppy Drive
	Replacing an Internal CD-ROM Drive
	Replacing Memory
	Replacing SBus Boards
	Replacing a Motherboard
	Changing/Verifying the RS-232/423 Jumpers
Complete the Replacement	
	Replace Test Computer (Reverse Remove the Test Computer procedure)
	Completing the Replacement

Prepare the Computer for Servicing

When replacing any component, perform the following steps.

! Caution

Computer equipment is extremely sensitive to static electricity. Handle boards and modules only by the edges and always wear a ground strap when handling them. When replacing or installing computer equipment, move the computer to a static-free environment.

For the Ultra 5:

1) Find the appropriate procedure in the Sun documentation, view and print out a copy if necessary. See Finding Sun Ultra 5/10 Procedures.
2) Install a SCSI host adaptor and verify the SCSI port if necessary. See Install a SCSI Host Adapter.
3) Shut down the system. See Shut Down the User Computer in Servicing the SS5 and Ultra 1 User Computers.
4) Disconnect the cables. See the section Disconnect the Ultra 5/10/60 Cables.
5) Open the Computer. Refer to the Sun documentation.

Note

If installing memory, the boot prom must be updated so that the additional memory is tested during POST. See Update the Boot PROM in Servicing the SS5 and Ultra 1 User Computers.

For the Ultra 10/60:

1) Find the appropriate procedure in the Sun documentation, view and print out a copy if necessary. For the Ultra 10, see Finding Sun Ultra 5/10 Procedures and for the Ultra 60, refer to Finding Ultra 60 Procedures.
2) Shut down the system. See Shut Down Using Tip Hardwire in Servicing the ELMA Test Computers.
3) Remove mainframe covers. See Removing or Replacing the Mainframe Covers in Servicing the ELMA Test Computers.
4) Disconnect the cables. See Disconnect the Ultra 5/10/60 Cables.
5) Remove the test computer from the system. See Remove the Test Computer.
6) Open the Computer. Refer to the Sun documentation.

Note

If installing memory, the boot prom must be updated so that the additional memory is tested during the power-on self-test. See Update the Boot PROM in Servicing the SS5 and Ultra 1 User Computers.

Disconnect the Ultra 5/10/60 Cables

1) Unplug the cables connected to the rear panel of the computer.

   For the Ultra 5, refer to the table Ultra 5 Cable List and the figure Rear View of Ultra 5 on Computer Cart.

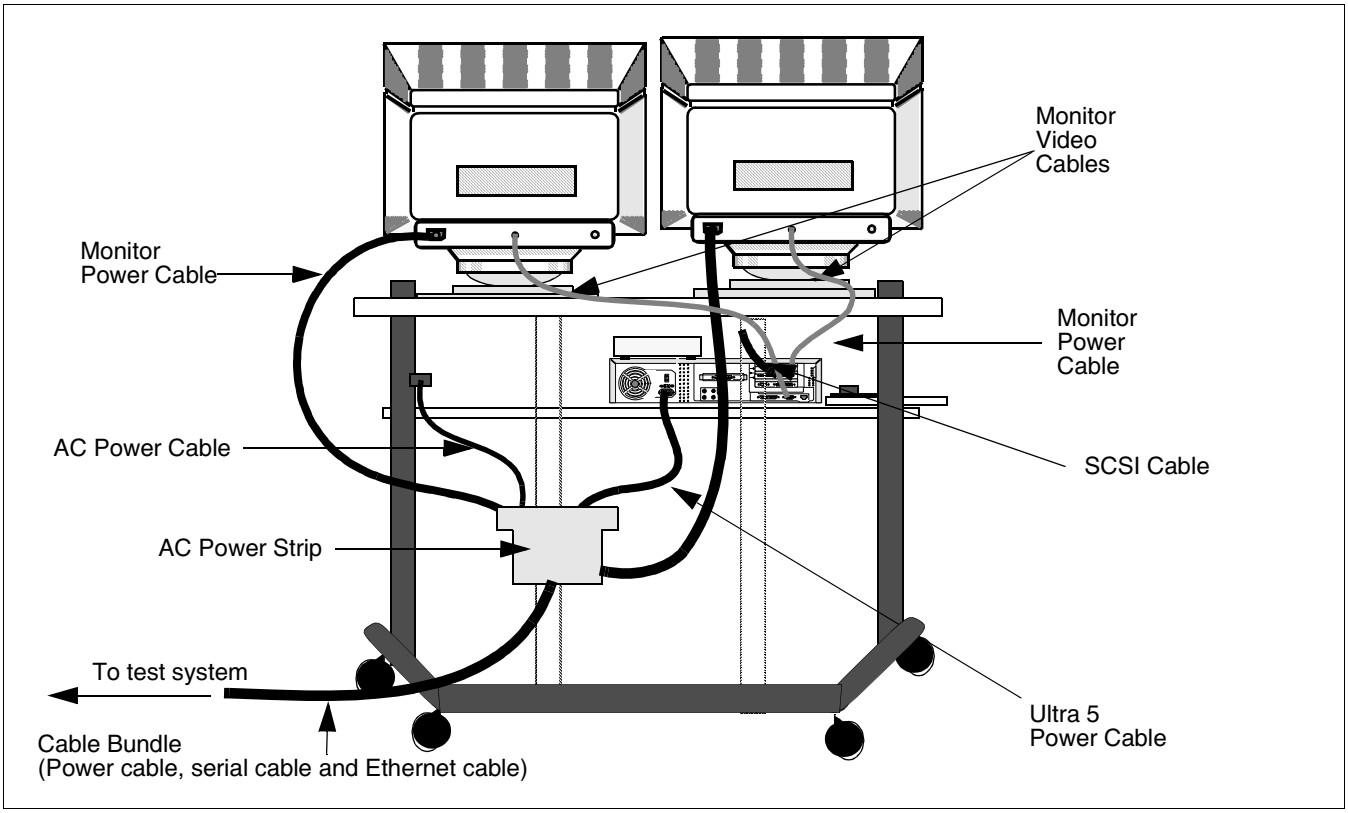
   For the Ultra 10, refer to the table Ultra 10/60 Cable List and the figure Ultra 10 Cables.

   For the Ultra 60, refer to Ultra 60 Cables and Ultra 10/60 Cable List.

2) After unplugging the cables, refer to Preparing to Replace a Component for the next preparation steps.

Ultra 5 Cable List

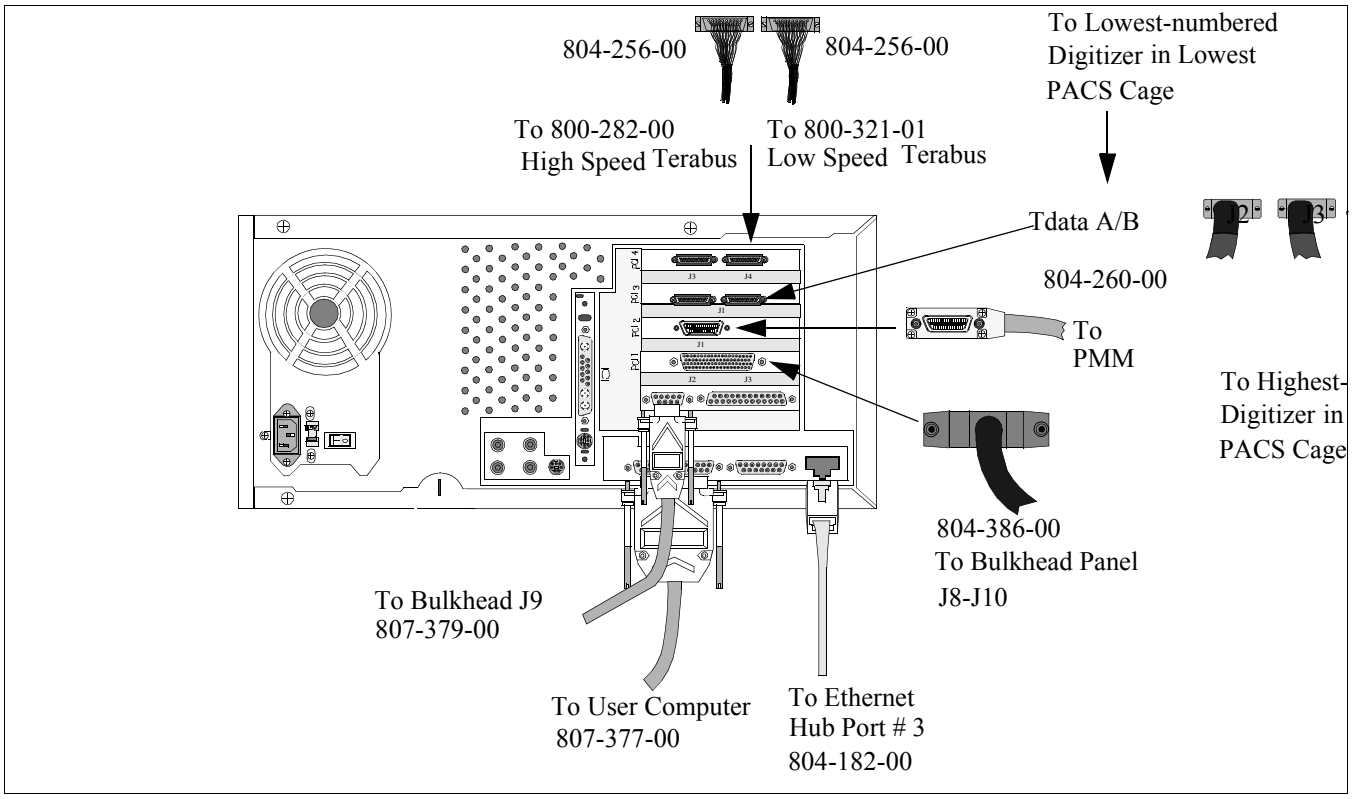
Description	PN	From	To
AC power cable, Ultra 5	807-352-00	Power Strip	Ultra 5 Power Connector
SCSI Cable	Part of Peripheral Kit	Narrow SCSI Connector (Ultra 140)	First SCSI Device
SCSI Cable	807-083-00	Wide SCSI Connector (Ultra 170)	First SCSI Device
Internal Ethernet Cable	804-182-00	Built-in Ethernet Connector (Ultra)	Hub
Ultra Serial Port B Cable	804-189-00	Serial Port B (Ultra 5)	Serial Port A (test computer)
Video Adapter Cable	Sun pn 530-2357-01)	Monitor connector (Ultra 5)	Monitor Cable
Second Ethernet Cable	804-884-00 or 424-428-20	Second Ethernet connector (Ultra)	Customer Net
CPU-24/VTF Port B-E Cable	804-316-00	CPU-24/VTF Serial Port B-E	Bulkhead J7- J10



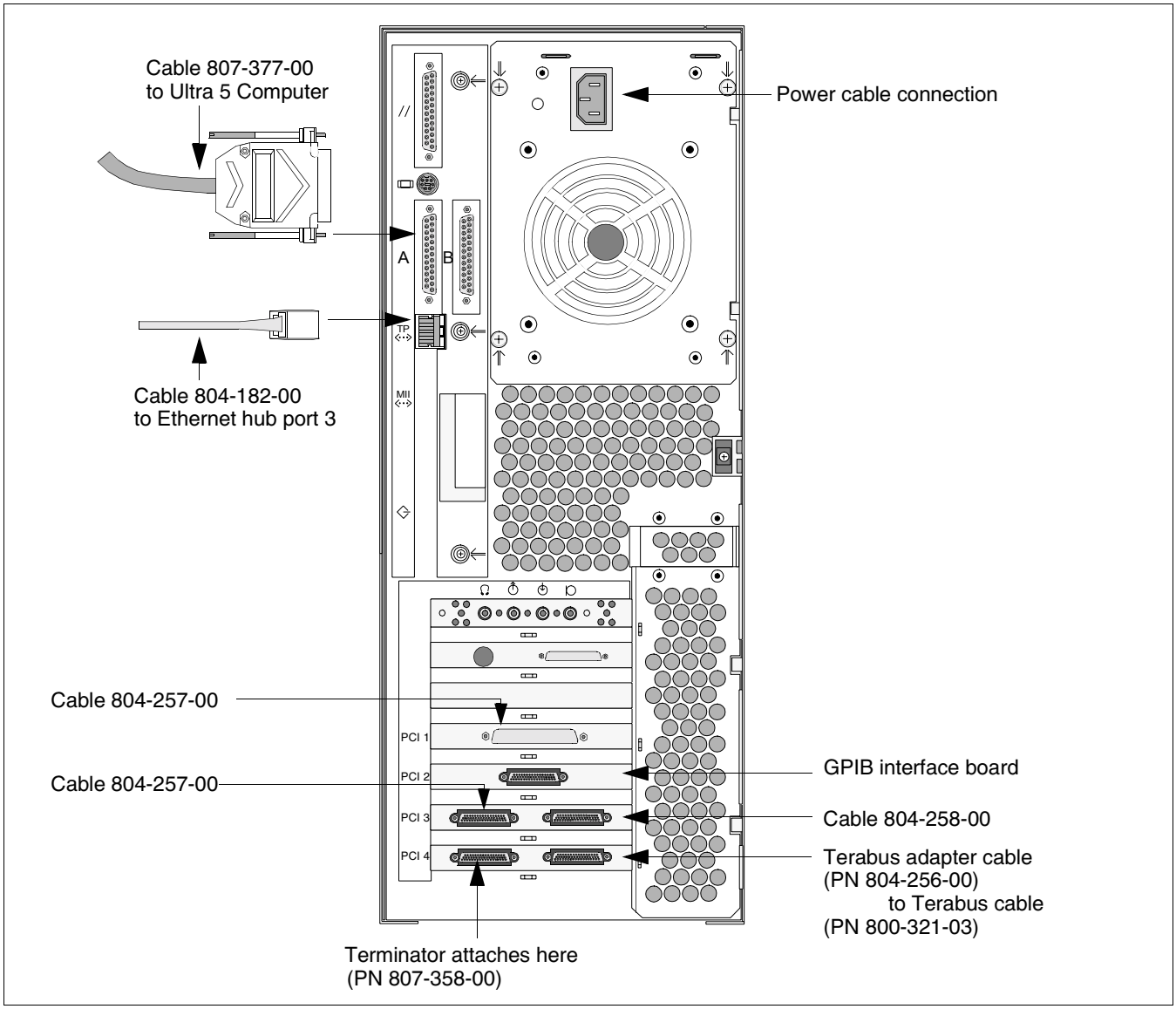
Rear View of Ultra 5 on Computer Cart

Ultra 10/60 Cable List

Description	PN	From	To
AC power cable, Ultra 10	807-352-00	AC Power Inlet	J1A on outlet strip
TCIO Bus Cable	804-257-00	PCI Slot 1 Connector J2	CDM#1 slot 5, rows 67-72
TCIO Y-Cable	804-258-00	PCI Slot 1 Connector J3	PACS Backplane #1, slot 8, rows 81-86
GPIB Cable	901-088-00	PCI Slot 2 Connector J1	Precision Multimeter
RS232 Serial Expansion Cable	804-386-00	PCI Slot 3 Connector J1	J8-J10 on Bulkhead
Terabus Adaptor Cable	804-256-00	PCI Slot 4 Connector J4	800-321-03 High speed Terabus
Terabus Terminator Plug	877-386-00	PCI Slot 4 Connector J3	Terabus Terminator Board
Internal Ethernet Cable	804-182-00	Built-in Ethernet Connector (Ultra)	Hub (Port 3)
Ultra Serial Port Cable	807-377-00	Serial Port A (Ultra 10)	Serial Port B (Ultra 5)



Ultra 10 Cables



Ultra 60 Cables

Install a SCSI Host Adapter

Unlike the SS5 and Ultra 1, the Ultra 5 does not utilize SCSI architecture for connecting and operating its internal devices. Instead it uses E-IDE (Enhanced integrated drive electronics). Similarly, it does not have an on-board SCSI adapter as part of its motherboard which would allow SCSI devices to connect to it.

If you need SCSI support, you can install an optional PCI-SCSI host adapter card (pn 425-431-00, kit pn 806-844-0X) (9 Gbyte HD pn 425-468-00). There are 2 ports on the PCI-Ultra SCSI interface, Port A and B. By default the factory ships the device connected to Port A. The PCI-SCSI Host Adapter supports up to 7 devices which have a total SCSI cable length of 6 meters or less. Furthermore, Ultra SCSI devices such as the 9 Gbyte external hard drive are auto-terminating, and therefore require no terminator. The hard disk's SCSI address is set to 0.

Note

If you connect the PCI-SCSI adaptor to Port B, you must boot -reconfigure (boot-r) the system so that it recognizes the device.

Remove the Test Computer

You must remove the Ultra 10/60 from the test system and computer sled before you can service it.

Warning

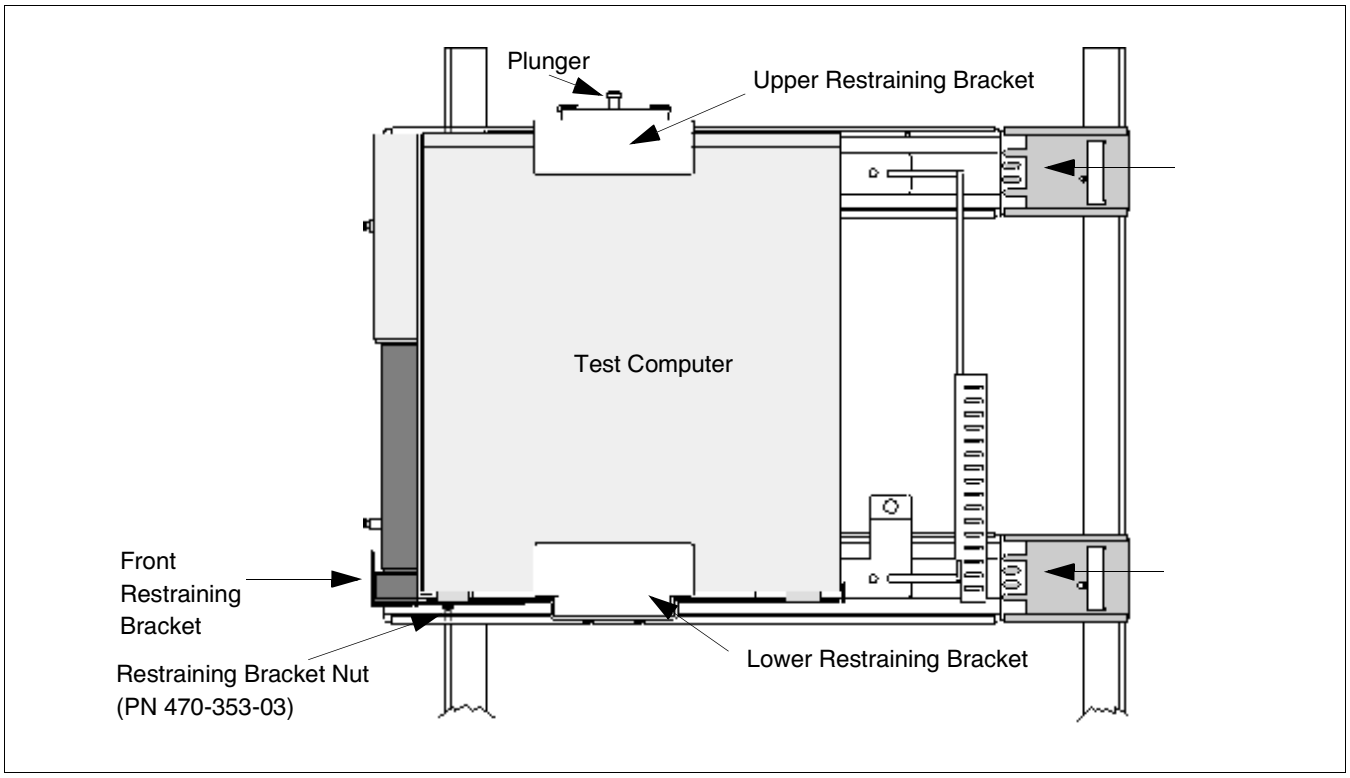
Two people should lift the Ultra 10/60 computer out of the system to avoid injury.

1) Verify that all cables have been disconnected from the Ultra 10/60 test computer. Refer to the table Ultra 10/60 Cable List and the figure Ultra 10 Cables or Ultra 60 Cables.
2) Pull the computer sled out until the arms lock in place.

For Steps 3 through 5, refer to the figure Ultra 10 Test Computer Sled.

3) Pull up on the plunger on the upper restraining bracket and retract the bracket.
4) Repeat Step 3 on lower restraining bracket.
5) Loosen the front restraining bracket nut (pn 470-353-03) and extend the bracket.

   The nut is accessible from the underside of the sled.
6) Lift the computer up and off the sled.
7) Place the computer on a flat surface for servicing.



Ultra 10 Test Computer Sled

Using the Sun Multimedia Documentation

Finding Sun Ultra 5/10 Procedures

The following Sun CDs show service procedures for the Ultra 5 and Ultra 10 computers:

- Ultra 5 ShowMe How Multimedia Installation Guide (Sun pn 724-2647-02)
- Ultra 10 ShowMe How Multimedia Installation Guide (Sun pn 724-2619-02)
- Sun Ultra 5/10 Software Supplement

The Sun Ultra 5/10 software supplement ships with both CDs.

Refer to Location of Ultra 5/10 Service Procedures to find each of the following procedures on the CDs:

- Power Down and Open
- Replacing a Power Supply
- Replacing a Hard Disk Drive (Ultra 5 only)
- Replacing a Floppy Disk Drive
- Replacing a CD-ROM Drive
- Replacing Memory

- Replacing or Installing a PCI Card
- Replacing a Motherboard
- Replacing a CPU Module
- Replacing a Graphics Card in the UPA Slot (Ultra 10 only)
- Changing/Verifying RS-232/423 Jumpers
- Close and Restart

Refer to the installation guide inside the CD jacket to install and run the Sun ShowMe How documentation. The Sun Ultra 5/10 service manual is an HTML document located on the Ultra 5/10 Software Supplement CD.

Note

The figures do not appear on the screen when you open the Ultra 5/10 Service Manual through a PC browser. For best results, view the ShowMe How documentation and print the procedure before servicing the Ultra 5 or Ultra 10.

Location of Ultra 5/10 Service Procedures

Procedure	ShowMe How (UNIX)	Sun Ultra 5/10 Service Manual (HTML)
Power down and Open	**Routine Procedures** > Shutting Down	Chapter 6 (Power On and Off) > Powering Off the System Unit and Chapter 7 (Internal Access) > Internal Access
Replacing a Power Supply		Chapter 8 (Major Subassemblies) > Power Supply > Removing the Power Supply or Replacing the Power Supply
Replacing a Hard Disk Drive (Ultra 5 only)	**Replacing Parts** > Replacing a Hard Disk Drive	Chapter 9 (Storage Devices) > Hard Drive
Replacing a Floppy Disk Drive	**Replacing Parts** > Replacing a Diskette Drive	Chapter 9 (Storage Devices) > Diskette Drive
Replacing a CD-Rom Drive	**Replacing Parts** > Replacing a CD-Rom	Chapter 9 (Storage Devices) > Hard Drive
Replacing Memory	**Replacing Parts** > Replacing DIMMS	Chapter 10 (Motherboard and Component Replacement) > DIMM
Replacing a PCI Card	**Replacing Parts** > Replacing a PCI Card	Chapter 10 (Motherboard and Component Replacement) > PCI Card
Installing a PCI Card	**Installing Parts** > Installing a PCI Card	
Replacing a Motherboard		Chapter 10 (Motherboard and Component Replacement) > Motherboard
Replacing a CPU Module	**Replacing Parts** > Replacing a CPU Module	Chapter 10 (Motherboard and Component Replacement) > CPU Module
Replacing a Graphics Card in the UPA Slot (Ultra 10 only)	**Installing Parts** > Installing a UPA Graphics Card (on the Ultra 10 CD)	Chapter 10 (Motherboard and Component Replacement) > UPA Graphics Card (Ultra 10)
Changing/Verifying RS-232/423 Jumpers	**Replacing Parts** > Reconfigure a Serial Port Jumper	Appendix C (Functional Description) > Jumper Settings
Close and Restart	**Routine Procedures** > Restarting the System	Chapter 7 (Internal Access) > Replacing the Top Cover and Chapter 6 (Power On and Off) > Powering On the System Unit

Finding Ultra 60 Procedures

The Ultra 60 Service procedures are found on the Sun Ultra 60 ShowME How Installation Guide (Sun pn 724-2649-01).

The following procedures are found under the heading Routine Procedures:

- Shutting Down (includes the procedure for opening the Ultra 60)
- Restarting (includes the procedure for closing the Ultra 60)

The following replacement/installation procedures are found in both the heading Installing Parts and Replacing Parts:

- System Memory
- UPA Graphics Card
- PCI Card
- CPU Module
- CD-ROM
- Diskette
- Reconfigure Serial Ports

The procedure for replacing the power supply is found at the beginning of the procedure for replacing system memory.

Refer to the installation guide inside the CD jacket to install and run the Sun ShowMe How documentation. Although it is possible to view the video portions of the ShowMe How CD on a PC, Teradyne recommends viewing and printing the appropriate procedures from a UNIX workstation before proceeding.

Completing the Replacement

To finish replacing a component in the Ultra 5/10/60 computers, follow this procedure:

Note

Anytime the system computer configuration changes (aside from swapping one part for an identical part), you must reconfigure Solaris 2. See Reconfigure the Solaris 2 System in Software Commands and Tests for this procedure.

For the Ultra 5:

1) Close the computer. See the Sun documentation for this procedure.
2) Reconnect the cables removed from the Ultra 5 in Disconnect the Ultra 5/10/60 Cables.
3) Turn on the system power and the test system power. This should automatically start booting the user computer. See Boot the User Computer in Software Commands and Tests.

4) Reconfigure Solaris 2 if necessary. See Reconfigure the Solaris 2 System in Software Commands and Tests for this procedure.

For the Ultra 10/60:

1) Close the computer. See the Sun documentation for this procedure.
2) Reverse the procedure in Remove the Test Computer to replace the test computer in the system.
3) Reconnect the cables removed from the test computer in Disconnect the Ultra 5/10/60 Cables.
4) Replace the mainframe covers. See Removing or Replacing the Mainframe Covers in Servicing the ELMA Test Computers.
5) Turn on the system power and the test system power. See Boot the Test Computer in Software Commands and Tests.
6) Reconfigure Solaris 2 if necessary. See Reconfigure the Solaris 2 System in Software Commands and Tests for this procedure.

Overview

The SUN Sun Blade 1500 user computer and Sun Blade 2500 test computer ship with documentation from Sun Microsystems. This chapter contains the following sections:

- Replacing the Sun Blade 1500 User Computer FRUs
- Replacing the Sun Blade 2500 Tester Computer FRUs

Replacing the Sun Blade 1500 User Computer FRUs

This topic describes how to remove and install the Sun Blade 1500 user computer replaceable units. Refer to the following table for the removal and installation procedures.

Part Number	Name	Removal Procedures	Installation Procedures
360-091-00	Two 256 MB DIMMs (512 MB total)	Remove	Install
360-096-00	350W Power Supply	Remove	Install
360-099-00	Motherboard - 1.062 GHz CPU	Remove	Install
360-092-00	80 GB Internal Hard Disk Drive	Remove	Install
445-004-00	Keyboard/Mouse		
360-095-00	XVR100 Video Card	Remove	Install
	Monitor (User)	Remove	Install
360-098-00	Internal 16X DVD-ROM	Remove	Install
445-035-00	Sun Blade 1500 User Computer	Remove	Install
360-097-00	EEPROM		

The Sun Blade 1500 user computer field replaceable units require Sun documentation for their removal. Refer to the Sun Blade 1500 Hardware Documentation CDROM (Sun part# 724-7412-03)

This topic includes the following sections:

- Removing the Sun Blade 1500 User Computer FRUs
- Installing the Sun Blade 1500 User Computer FRUs

Removing the Sun Blade 1500 User Computer FRUs

This topic describes how to remove the Sun Blade 1500 user computer FRUs. It contains the following sections:

Perform the following steps:

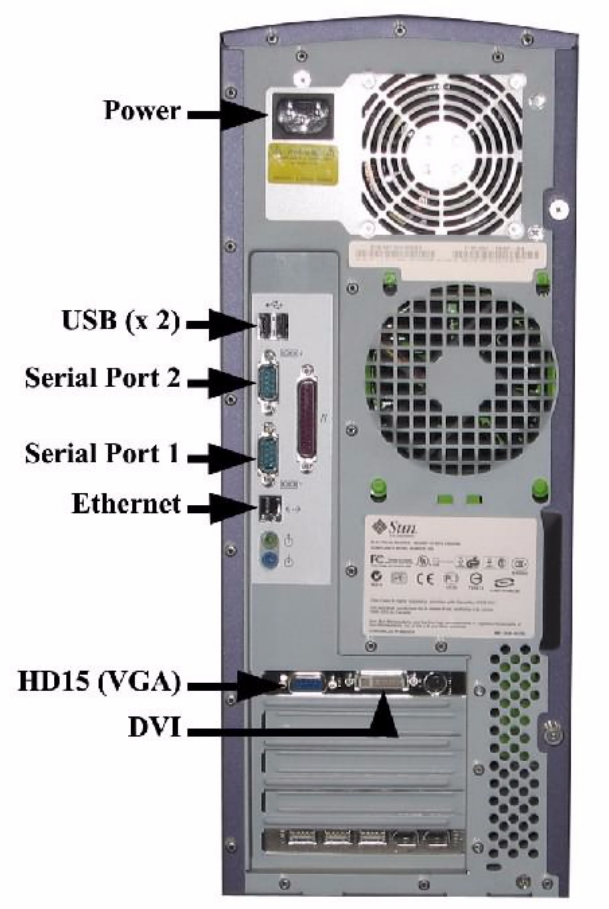
1) Perform the appropriate lockout/tagout procedures.
2) Remove the following Sun Blade 1500 user computer cables:
   - Cable 807-352-00 208V Power Cable/Power Inlet
   - Keyboard/mouse connector (no part number)
   - 811-113-00 ethernet cable
   - 811-115-00 serial cable from port 2 to sun blade 2500
   - 811-048-00 serial cable from port 1 to SMC node
   - 425-436-00 monitor adaptor cable for primary monitor
   - 361-730-00 video cable for secondary monitor
3) Refer to the Sun Blade 1500 Hardware Documentation CDROM (Sun part# 724-7412-03) for removal procedures.

Removing the Sun Blade 1500 User Computer Monitor

This topic describes how to remove the primary and secondary monitors from the Sun Blade 1500 User Computer.

Primary Monitor:

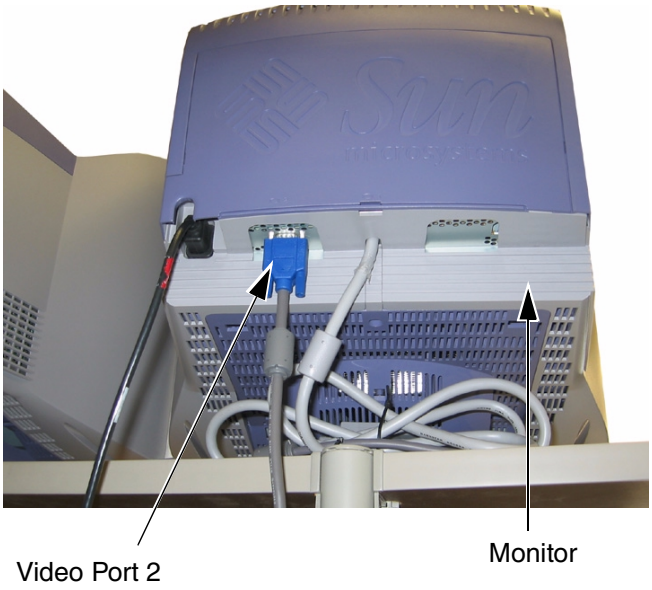
1) Power down the monitor.
2) Disconnect the monitor power cord from the outlet strip on the Anthro cart.
3) Disconnect the video cable from the VGA port on the back of the Sun Blade 1500 tower. Refer to the figure Sun Blade 1500 Workstation Back.



Sun Blade 1500 Workstation Back

Secondary Monitor:

1) Power down the monitor.
2) Disconnect the monitor power cord from the outlet strip on the Anthro cart.
3) Disconnect the video cable from VGA video port 2 on the back of the monitor. See the figure Video Port 2.



Video Port 2

Installing the Sun Blade 1500 User Computer Monitor

This topic describes how to remove the primary and secondary monitors from the Sun Blade 1500 User Computer.

Primary Monitor:

1) Connect one end of the monitor power cord to the outlet strip on the Anthro cart. Connect the other end of the power cord to the monitor.
2) Connect the video cable from the VGA port on the back of the Sun Blade 1500 tower. See the figure Sun Blade 1500 Workstation Back.

Secondary Monitor:

1) Connect one end of the monitor power cord to the outlet strip on the Anthro cart. Connect the other end of the power cord to the monitor.
2) Connect the video cable to VGA video port 2 on the back of the monitor. See the figure Video Port 2.

Installing the Sun Blade 1500 User Computer FRUs

This topic describes how to install the Sun Blade 1500 user computer FRUs.

Perform to following steps:

1) Refer to Sun Blade 1500 Hardware Documentation CDROM (Sun part# 724-7412-03) for initial installation procedures.
2) Install the following Sun Blade 1500 user computer cables:
   - Cable 807-352-00 208V Power Cable/Power Inlet
   - Keyboard/mouse connector (no part number)
   - 811-113-00 ethernet cable
   - 811-115-00 serial cable from port 2 to sun blade 2500
   - 811-048-00 serial cable from port 1 to SMC node
   - 425-436-00 monitor adaptor cable for primary monitor
   - 361-730-00 video cable for secondary monitor

Replacing the Sun Blade 2500 Tester Computer FRUs

This topic describes how to remove and install the Sun Blade 2500 Test Computer field replaceable units (FRUs). Refer to the following table for the removal and installation procedures.

Part Numbers	Name	Removal Procedures	Installation Procedures
425-432-00	General Purpose Interface (GPIB) Board	Remove	Install
360-090-00	Motherboard (Two 1.28 GHz CPUs)	Remove	Install
360-084-00 360-085-00 360-083-00	Front Fan Assembly Rear Fan Assembly CPU Fan/Heatsink Assembly	Remove	Install
445-004-00	Keyboard/Mouse		
360-089-00	Two 1GB DIMMs (2GB Total)	Remove	Install
	Sun Blade 2500 Test Computer (512 MB RAM)	Remove	Install
360-087-00	475W Power Supply	Remove	Install
804-256-00	Terabus Adapter Cable	Remove	Install
425-462-00	RS232 Board	Remove	Install
879-701-00	Terabus Terminator Board	Remove	Install
949-823-01	Bus Interface Board	Remove	Install
949-824-01	Terabus Adapter Board	Remove	Install
360-086-00	EEPROM		

Required Tools

- #0 Phillips screwdriver
- #2 Phillips screwdriver
- 10-32 caps nutdriver
- 1/16 in. flat-blade screwdriver

Using Sun Documentation

The following Sun Blade 2500 test computer replaceable units require Sun documentation for their removal and installation procedures:

- Motherboard (two 1.28GHz CPUs)
- Front Fan Assembly
- Rear Fan assembly
- Two 1 GB DIMMs (2GB total)
- CPU Fan (Heatsink)
- 475W Power Supply

Refer to the Sun™ Sun Blade 2500 Hardware Documentation CDROM (Sun part# 724-7413-03) for installation and removal procedures. Contact Sun directly for up-to-date documentation.

Remove the Sun Blade 2500 Tester Computer

You must remove the Sun Blade 2500 test computer from the test system and computer sled before you can service it. Perform the following steps to remove the Sun Blade 2500 tester computer (445-036-00).

Warning

To avoid injury, two people must lift the Sun Blade 2500 Test Computer from the system.

Note

A static strap must be worn while handling any static sensitive device in the computer.

1) Save any open files.
2) Shut down test system power by clicking on the “OFF - NO DRAINBACK" button in the SMC GUI.
3) Exit the IMAGE program.
4) Halt the computer by typing “halt_sys".
5) Turn the CB1 circuit breaker to the OFF position and perform the appropriate Lockout/Tagout procedures.

Disconnect the Cables

This section describes how to disconnect the cables from the operator side of the Sun Blade 2500 test computer.

! Caution

For all steps in this section, use a static strap.

Note

The cables mentioned in steps 1-7 below are mounted to their connectors on the test computer with very small screws. Do not drop the screws into the mainframe when removing the cables.

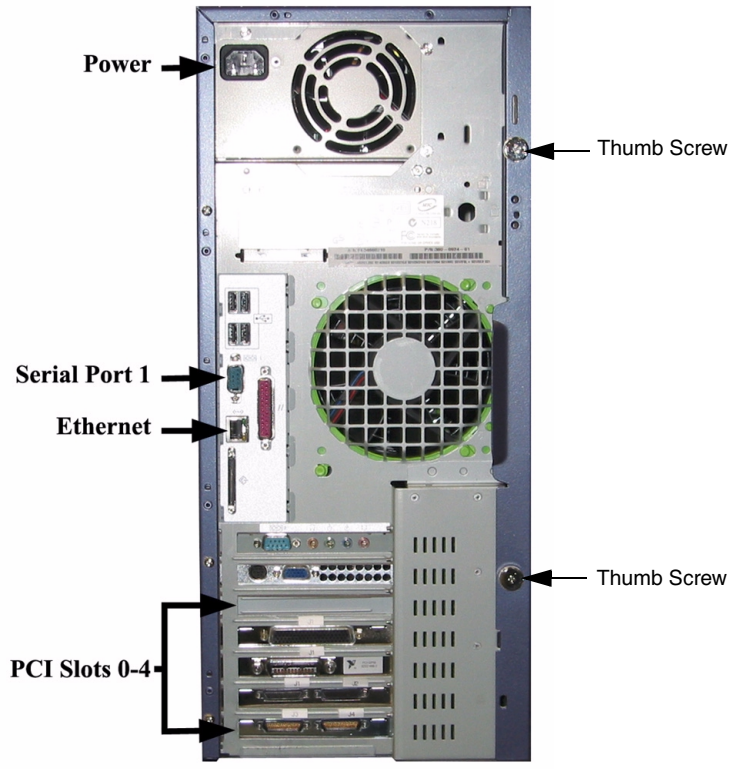
1) Disconnect the RS232 expansion board cable 866-159-00 from PCI slot 3 in the Sun Blade 2500.
2) Disconnect the GPIB cable (901-090-00) from PCI slot 2 or 4 in the Sun Blade 2500 test computer.
3) Disconnect cables 804-257-00 and 804-258-00 from the BIF board located in PCI slot 1 of the Sun Blade 2500 test computer and leave them in the mainframe.
4) Disconnect the Terabus adaptor cable 804-256-00 from the right connector of the Terabus adaptor board in PCI slot 0 in the Sun Blade 2500 test computer.
5) Disconnect cable 811-115-00 from serial port 1 on the Sun Blade 2500 test computer.
6) Disconnect cable 811-112-00 from the ethernet port on the Sun Blade 2500 test computer.
7) Disconnect power cable 807-387-02 from the Sun Blade 2500 test computer..

Install the Sun Blade 2500 Tester Computer

Note

The following steps must be performed on a firm, stable, static-free work surface.

1) Remove the right captive screws from the rear of the Sun Blade 2500 computer.



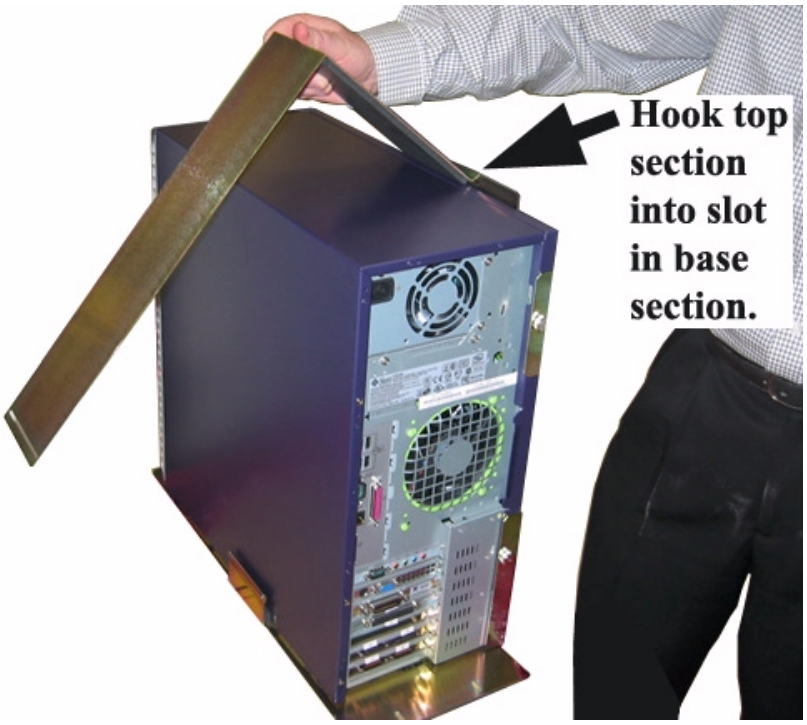
Thumb Screws

2) Set the Sun Blade 2500 computer on the base section of the mounting assembly so that the front of the computer is flush with the down angled tongue and the rear of the computer is flush against the stop angle. See the figure Sun Blade 2500 and Mounting Assembly.

Sun Blade 2500 and Mounting Assembly

3) Reinstall the captive screws in the Sun Blade 2500, threading them through the holes in the stop angle in the base section. See the figure Sun Blade 2500 and Mounting Assembly.

4) Secure the Sun Blade 2500 to the base section by slipping the top section into the upper slot of the base section and catching the hook on the lower end of the base section. See the figures Sun Blade Mounting Sled and Securing Top Section.



Sun Blade Mounting Sled

Securing Top Section

Warning

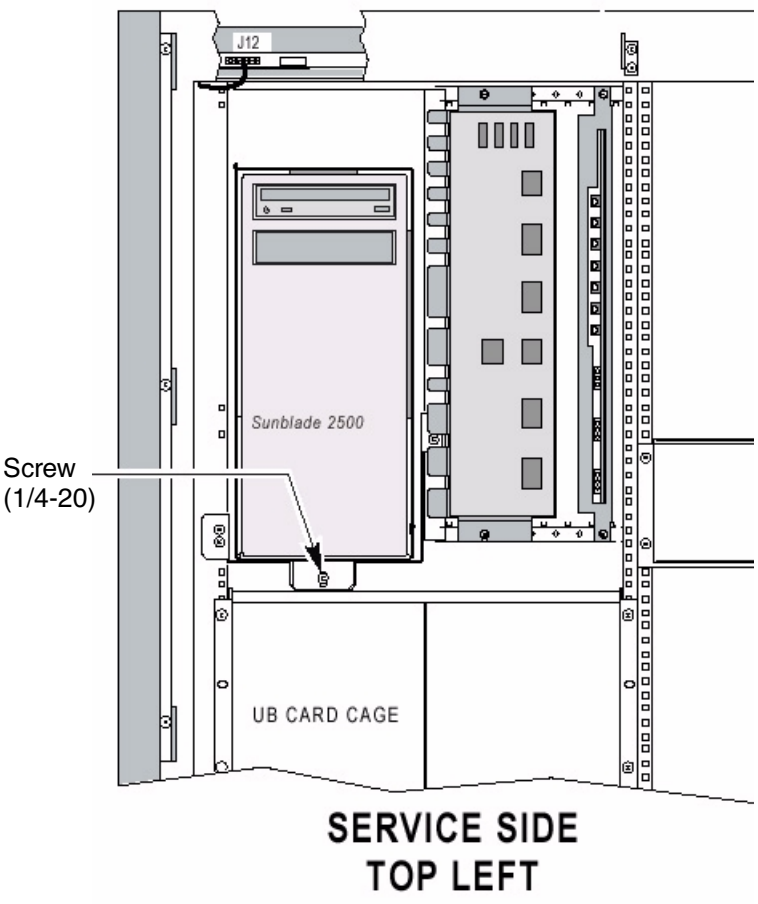
Two people should lift the computer onto the tray to avoid injury.

5) On the service side, lift the Sun Blade 2500 in its mechanics assembly onto the tray section and slide it in until the down angled tongue is flush with the tray section. See the figure Installing Mechanics Assembly.

Installing Mechanics Assembly

6) Insert a 1/4-20 screw through the hole in the down angled tongue to secure the assembly to the tray section. See the figure Service Side Installed.

7) Torque the screw to 70 in-lbs.



Service Side Installed

8) On the operator side, Insert two 10-32 screws through the tapped holes to secure the base section to the tray section. See the figure Operator Side Installed.

9) Torque the screws to 30 in-lb.

Operator Side Installed

Connect the Sun Blade 2500 Cables

1) Connect the ethernet cable (811-112-00) to the ethernet port on the Sun Blade 2500 computer.

2) Connect the serial cable (811-115-00) to serial port 1 on the Sun Blade 2500 computer.

3) Connect the power cable (807-387-02) from the Sun Blade 2500 computer plug to the outlet strip.

4) Connect the Terabus adaptor cable 804-256-00 to the right-hand connector of the Terabus adaptor board in PCI slot 0 in the Sun Blade 2500.

   There is no need to terminate the left connector on the Terabus adaptor board as termination is hard wired to the connector.

5) Connect the TCIO cable (804-257-00) to the left connector on the BIF board located in PCI slot 1 in the Sun Blade 2500 computer.

6) Connect the TCIO Y-cable (804-258-00) to the right-hand connector on the BIF board located in PCI slot 1 of the Sun Blade 2500 computer.

7) Connect the RS232 expansion board cable (866-159-00) to the RS232 expansion card in PCI slot 3 in the Sun Blade 2500 computer.

8) Connect the GPIB cable (901-090-00) to the GPIB card in PCI slot 2 or 4 in the Sun Blade 2500 computer.

Remove Sun Sun Blade 2500 Tester Computer Components

Remove the following Sun Blade 2500 Tester Computer components by Removing the Tester Computer and referring to the SUN™ Sun Blade 2500 Hardware Documentation CDROM
(Sun part # 724-7413-03).

- Motherboard (2 CPUs)
- Rear Fan Assembly
- Front Fan Assembly
- Two 1 GB DIMMs (2 GB total)
- Two 1.28 GHz processor modules
- 475W power supply

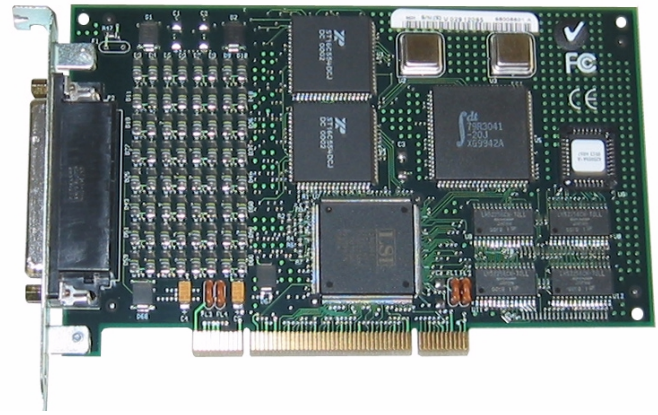
Install the Sun Sun Blade 2500 Tester Computer Components

Install the following Sun Blade 2500 Tester Computer components by Installing the Tester Computer and referring to the SUN™ Sun Blade 2500 Hardware Documentation CDROM (Sun part# 724-7413-03).

- Motherboard (2 CPUs)
- Rear Fan Assembly
- Front Fan Assembly
- Two 1 GB DIMMs (2 GB total)
- Two 1.28 GHz processor modules
- 475W power supply

Remove the RS232 Board

Perform the following steps to remove the RS232 board (425-462-00) from PCI slot 1. See the figure RS232 Board.

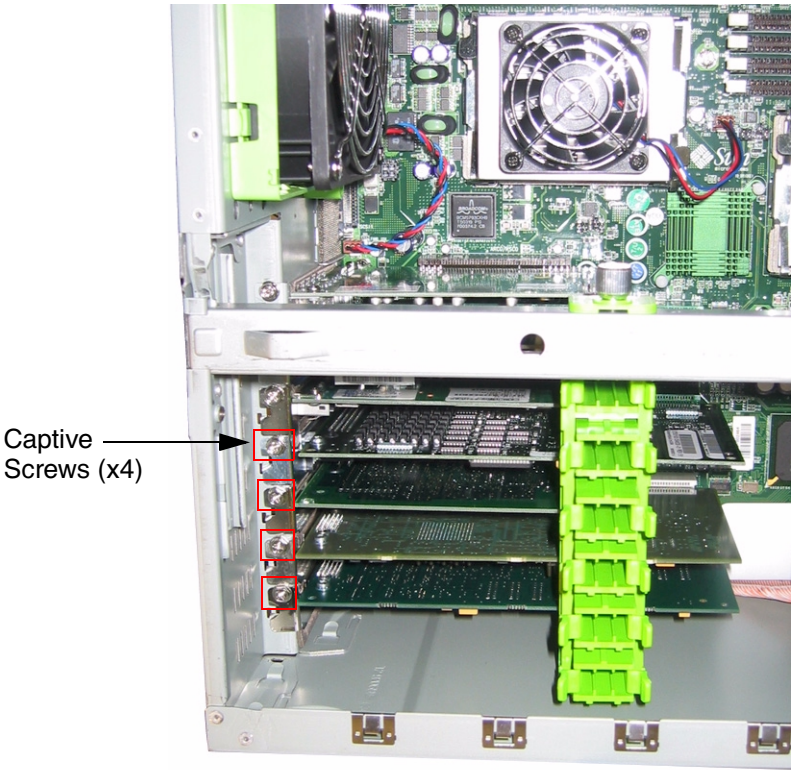


RS232 Board

Caution

When removing the RS232 board, pull it out straight. If pulled out at an angle, the board may damage the computer's EMI shielding.

1) Follow the procedures to Remove the Sun Blade 2500 Tester Computer.
2) Remove the captive thumb screws from the rear of the Sun Blade 2500 and remove the cover. Remove the PCI card brace.
3) Use a Phillips screwdriver to remove the screw that secures the RS232 board to the Sun Blade 2500 Tester Computer. See the figure PCI Card Screws.



PCI Card Screws

4) Holding the corners of the board, pull the board straight out of PCI slot 3.

Install the RS232 Board

Perform the following steps to install the RS232 board (425-462-00) into PCI slot 3.

See the figure RS232 Board and the figure PCI Card Screws.

! Caution

When installing the RS232 board, insert it straight into the computer. If inserted at an angle, the board may damage the computer's EMI shielding.

1) Insert the RS232 board straight into PCI slot 3 of the Sun Blade 2500 Tester Computer.
2) Using a Phillips screwdriver, attach the screw that secures the board to the Sun Blade 2500 Tester Computer.
3) Reinstall the PCI card brace and tower cover.
4) Reinsert the captive thumb screws at the rear of the Sun Blade 2500 to secure the tower cover.
5) Follow the procedures to Install the Sun Blade 2500 Tester Computer.

Remove the General Purpose Interface Bus Board

Perform the following steps to remove the general purpose interface bus (GPIB) board (425-432-00) from PCI slot 2 or 4.

! Caution

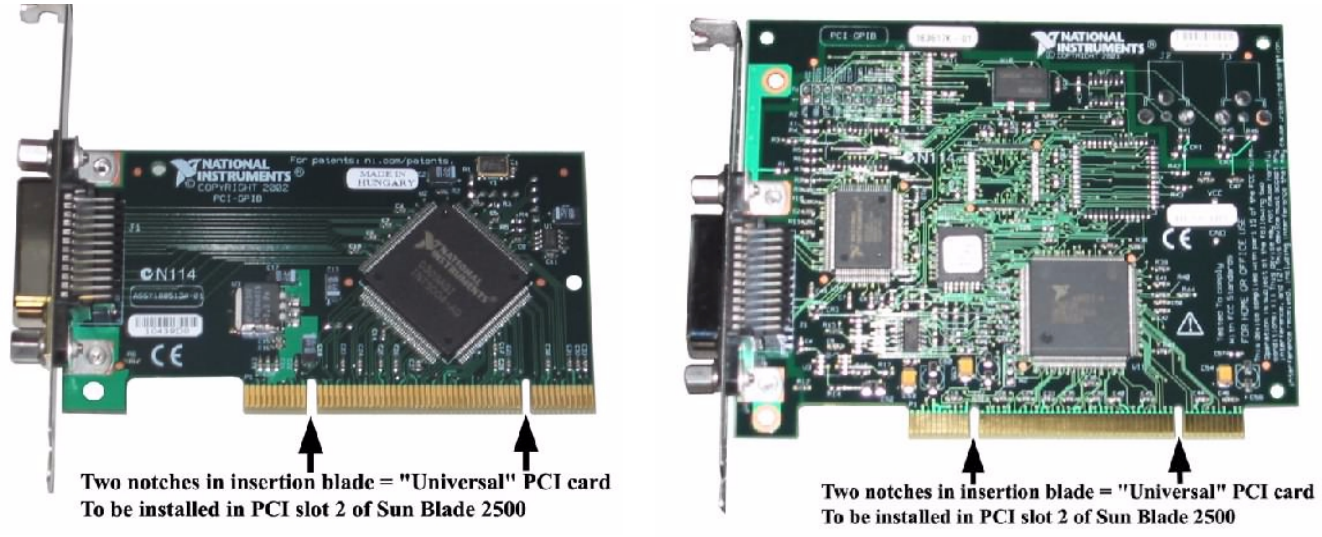
When removing the GPIB board, pull it out straight. If pulled out at an angle, the board may damage the computer's EMI shielding.

1) Follow the procedures to Remove the Sun Blade 2500 Tester Computer.
2) Remove the captive thumb screws from the rear of the Sun Blade 2500 and remove the cover. Remove the PCI card brace.
3) Using a Phillips screwdriver, remove the screw that secures the GPIB board to the Sun Blade 2500 test computer via its mounting bracket. See the figure PCI Card Screws.
4) Holding the corners of the board, pull it straight out of PCI slot 2 or 4.

Install the General Purpose Interface Bus Board

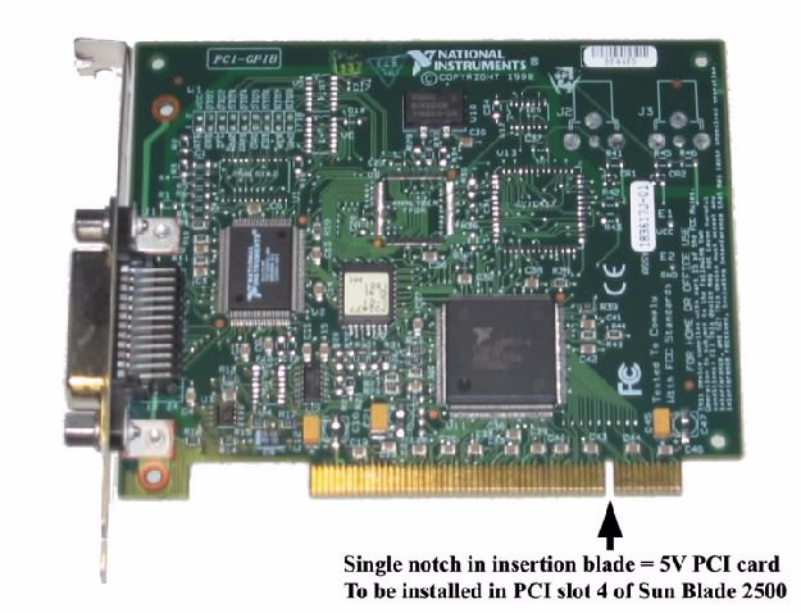
Perform the following steps to install the GPIB board (425-432-00) into PCI slot 2 or 4.

If the GPIB card is keyed with two notches in the insertion blade, it is a "Universal" PCI card and must be installed in PCI slot 2. See the figure Universal GPIB PCI Cards.


Two notches in insertion blade = "Universal" PCI card
To be installed in PCI slot 2 of Sun Blade 2500
Two notches in insertion blade = "Universal" PCI card
To be installed in PCI slot 2 of Sun Blade 2500

Universal GPIB PCI Cards

If the GPIB card is keyed with one notch in the insertion blade, it is a 5V PCI card and must be installed in PCI slot 4. See the figure 5V GPIB Card.



5V GPIB Card

Caution

When installing the GPIB board, insert it straight into the computer. If inserted at an angle, the board may damage the computer's EMI shielding.

1) Insert the GPIB board into PCI slot 2 of the Sun Blade 2500 tester computer.
2) Using a Phillips screwdriver, attach the screw that secures the board to the Sun Blade 2500 test computer via its mounting bracket.
3) Follow the procedures to Install the Sun Blade 2500 Tester Computer.

Remove the Bus Interface Board

Perform the following steps to remove the bus interface (BIF) board (949-823-01) from PCI slot 1. See the figure Bus Interface Board.

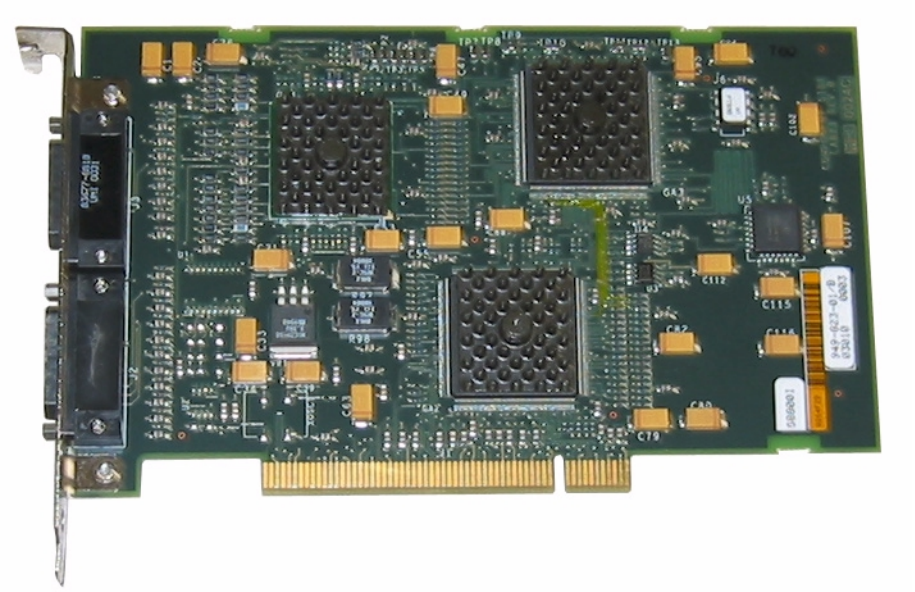
Caution

When removing the BIF board, pull it out straight. If pulled out at an angle, the board may damage the computer's EMI shielding.

1) Follow the procedures to Remove the Sun Blade 2500 Tester Computer.
2) Remove the captive thumb screws from the rear of the Sun Blade 2500 and remove the cover. Remove the PCI card brace.
3) Remove the screw that secures the Bus Interface board to the Sun Blade 2500 Tester Computer with a Phillips screwdriver via its mounting bracket. See the figure PCI Card Screws.
4) Holding the corners of the board, pull it straight out of PCI slot 1.

Install the Bus Interface Board

Perform the following steps to install the bus interface board (949-823-01) into PCI slot 1. See the figure Bus Interface Board



Bus Interface Board

! Caution

When installing the BIF board, insert it straight into the computer. If inserted at an angle, the board may damage the computer's EMI shielding.

1) Insert the bus interface board straight into PCI slot 1 of the Sun Blade 2500 Tester Computer.
2) Using a Phillips screwdriver, attach the screw that secures the board to the tower frame via its mounting bracket.
3) Install the captive thumb screws at the rear of the Sun Blade 2500 and reinstall the cover. Install the PCI card brace.
4) Follow the procedures to Install the Sun Blade 2500 Tester Computer.

Remove the Terabus Adapter Board

Perform the following steps to remove the Terabus adapter board (949-824-01) from PCI slot 0.

! Caution

When removing the Terabus adapter board, pull it out straight. If pulled out at an angle, the board may damage the computer's EMI shielding.

1) Remove the Sun Blade 2500 Tester Computer.
2) Remove the captive thumb screws from the rear of the Sun Blade 2500 and remove the cover. Remove the PCI card brace.
3) Using a Phillips screwdriver, remove the screw that secures the Terabus adapter board to the Sun Blade 2500 Tester Computer.
4) Holding the corners of the board, pull it out of PCI slot 0.

Install the Terabus Adapter Board

Perform the following steps to install the Terabus adapter board (949-824-01) from PCI slot 0.

! Caution

When installing the Terabus adapter board, insert it straight into the computer. If inserted at an angle, the board may damage the computer's EMI shielding.

1) Insert the Terabus adapter board into PCI slot 0 in the Sun Blade 2500 Tester Computer.
2) Using a Phillips screwdriver, attach the screw that secures the board to the Sun Blade 2500 Tester Computer.
3) Install the captive thumb screws at the rear of the Sun Blade 2500 and reinstall the cover. Install the PCI card brace.
4) Install the Sun Blade 2500 Tester Computer.

Remove the Terabus Terminator Board

Perform the following steps to remove the Terabus terminator board (879-701-00):

1) Remove the ground connector from J2 and the +5V connector from J3 of the terminator.
2) Lift the two flipper fasteners holding the low-speed Terabus cable (800-321-03) and remove it from the Terabus terminator board connector.
3) Using a #2 Phillips screwdriver, remove the two screws that connect the terminator's standoff bracket to the support cabinet.
4) Remove the four small screws that connect the terminator to the standoff bracket with a #0 Phillips screwdriver.

Install the Terabus Terminator Board

Perform the following steps to install the Terabus terminator board (879-701-00):

5) Secure the four small screws that connect the terminator to the standoff bracket with a #0 Phillips screwdriver.
6) Using a #2 Phillips screwdriver, secure the two screws that connect the terminator's standoff bracket to the support cabinet.
7) Connect the low-speed Terabus cable (800-321-03) connector to the terminator board's connector and close the two flipper fasteners.
8) Attach the ground connector from J2 and the +5V connector from J3 of the terminator.

Remove the Terabus Adapter Cable

Perform the following steps to remove the Terabus adapter cable (804-256-00):

1) Using a flat-blade screwdriver, remove the two screws that connect the Terabus adapter cable to the Terabus adapter board.
2) Unplug the terminator board's connector from connector J4.

Install the Terabus Adapter Cable

Perform the following steps to install the Terabus adapter cable (804-256-00):

1) Attach the Terabus adapter cable to connector J4 of the Terabus adapter board.
2) Using a flat-blade screwdriver, secure the two screws that connect the Terabus adapter cable to the Terabus adapter board.

Boot the Sun Blade 2500 Tester Computer After a FRU Replacement

The following section describes how to boot the Sun Blade 2500 Tester Computer after a FRU replacement.

1) Turn on the main power.
2) Turn on the test system power.
3) While the system is booting up, verify that no failure messages are displayed in the self-test mode while the user and Tester Computers are booting up.

Note

The Sun Blade 2500 Tester Computer will not boot and will display the following timeout message:

```
Timeout waiting for ARP/RARP packet
```

4) At the login prompt, type **checkers**.
5) Type **tip hardwire** to connect to the Sun Blade 2500 Tester Computer.
6) Type **~#** to display the ok prompt.
7) To restore all of the NVRAM settings to Sun's default values, enter the following command:
   `ok> set-defaults`
8) To configure the Sun Blade 2500 Tester Computer's environmental settings, enter the following commands:

   `ok> setenv input-device ttya`

   `ok> setenv output-device ttya`

   `ok> setenv boot-device net`

   `ok> banner` (Note the Ethernet address)

The following figure is an example of a banner:

```
Sun Ultra 60 UPA/PCI (2 X UltraSPARC-II
450MHz), No Keyboard OpenBoot 3.23, 256 MB
memory installed,Serial #13084444. Ethernet
address 8:0:20:c7:a7:1c,Host ID: 80c7a71c.
```

9) Type **~.** to exit the Sun Blade 2500 Tester Computer.

Update the /etc/ethers File

Perform the following two steps if the user computer is the master of its own NIS domain:

! Caution

Do not perform this step if the test sytem is bound to an NIS domain mastered by a remote server. If this occurs, general network conflicts may occur. Instead, contact the test system site's local system administrator.

1) Log in to the user computer as `root` by typing **su**.
2) Enter the following commands to boot the Sun Blade 2500 Tester Computer:

```
# echo "Ethernet address <tab>    hostname of tester" >>
/etc/ethers
```

```
# cd /var/yp;/usr/ccs/bin/make ethers
```

```
Ex.
```

```
# echo  "8:0:20:c7:a7:1c tester1t >>     /etc/ethers"
```

```
# cd /var/yp;/usr/ccs/bin/make ethers
```

3) Boot the test computer by entering the following commands:

```
# tip hardwire
Press Return.
ok> boot
```

4) Type **~.** to exit the Sun Blade 2500 Tester Computer.

System Verification

Overview

At this point, the upgrade is complete and is ready to be verified. The Sun Blade 1500 comes with Solaris8 and IMAGE software preloaded.

System Verification

1) Turn the MAIN POWER to ON on the test system to initiate the boot sequence.
2) Login as user “checkers” When prompted for a password, press the Return key.
3) By default, Solaris 8 is equipped with a power management utility that can shut down the computers if left idle. This can impact the computers during extended production or checkers runs so it is advised to remove this utility.
   a) To confirm the utility's presence on the user computer, execute the following:
   pkginfo | grep "Power Management"

   If the utility is installed, the following packages will result:
   SUNWpmowm
   SUNWpmowr
   SUNWpmowu
   SUNWpmr
   SUNWpmu
   SUNWpmux

   b) To confirm the utility's presence on the test computer, execute the following where "TESTER" is the test computer's hostname:
   pkginfo -R /export/root/TESTER | grep "Power Management"

   If the utility is installed, the following packages will result:
   SUNWpmowr
   SUNWpmr

   c) If present, execute the following to remove the power management utility, execute the following on the user comptuer:Become root by typing **su** and when prompted for a password, press the Return key.
      - **pkgrm SUNWpmowm SUNWpmowr SUNWpmowu SUNWpmr SUNWpmu SUNWpmux**
      - **pkgrm -R /export/root/TESTER SUNWpmowr SUNWpmr**
      - **reboot**
4) Login as user “checkers” When prompted for a password, press the Return key.

5) View current frame buffer configuration with the following command:

   /usr/teradyne/sst/bin/fb_setup -status

   The output will report what frame buffers are active, what mode they operate in and what resolutions they are set to. Login as root and run the following command to change the settings if desired:

   /usr/teradyne/sst/bin/fb_setup -setup

6) Launch the IMAGE program.

7) The monitors also have an auto-power-off utility which is controlled by the system screen saver program. To disable the screen saver, execute the following as all users:

   a) For systems using **openwindows**:
   Right-click in the workspace to open the menu
   Right-click **Properties** and select **Openwindows Properties**
   In the **Openwindows Properties** window, right-click Category and select Miscellaneous
   In the Miscellaneous category, click OFF for screen saver.

   b) For systems using **CDE**:
   Right-click in the workspace to open the menu
   Right click **Tools** and select **Desktop Controls**
   In the **Desktop Controls** window, select **Screen Style Manager**
   In the **Screen Style Manager**, click **OFF** for screen saver.

3) For Tiger systems, the SMC software must be loaded. Verify what version of SMCGUI is run at the customer's facility and install it using the SMC CDROM (IS-060-10) by following the CDROM's readme file.

4) Activate test system power.

   a) For Tiger systems, open the SMC GUI and initiate the test power sequence.

   b) For Catalyst systems, turn on the TEST POWER switch.

3) Initialize the test system by typing **initialize** in the console.

4) Open Station5 in IMAGE and run syscheck to verify test system stability.

5) Once syscheck is complete, release the system to the facility systems administrator to change the network configuration.

Changing a Catalyst Test System's Network Configuration

This topic describes how to change the network configuration of test systems running the Solaris 8 operating system. There are two different processes to be followed, depending on if the system's user computer acts as an NIS master or as an NIS client:

This section describes how to change a system's network configuration.

During the configuration change, both user and test computer must be booted and idle and IMAGE must not be running.

1) Log in to the user computer as root.

! Caution

When running the change sys name script, DO NOT HALT the test computer regardless of the script's instructions.

2) Enter the following to open a cshell and launch the change_sys_name script:

   csh
   /usr/teradyne/sst/bin/change_sys_name

3) Follow the script's prompts and enter the new host names and IP addresses for the user and test computers.

! Caution

Do not reboot the system if its domainname or NIS master's hostname is to be changed.

4) Enter the following to launch the configure_nis script on the user computer:

   /usr/teradyne/sst/bin/configure_nis

5) Follow the script's prompts and enter the NIS master's hostname and domainname information.

6) Enter the following to open a serial connection to the test computer:

   tip hardwire

7) Strike the return key to get a login prompt and log in to the test computer as root.

8) Enter the following to open a cshell and launch the configure_nis script on the test computer:

   csh
   /usr/teradyne/sst/bin/configure_nis

9) Follow the script's prompts and enter the NIS master's hostname and domainname information.

10) Log out of the test computer and close the serial connection by striking the ~. keys.

11) Reboot the system to allow the changes to take effect and confirm the changes.

Overview

This chapter describes the procedure for installing or upgrading ELMA test computer equipment. The chapter includes the following sections:

- Preparing to Replace a Component
- Replacing ELMA Computer Components
- Replacing ELMA Peripherals
- Replacing Test Computer Peripherals
- Completing the Replacement

Preparing to Replace a Component

Before you remove or install any computer components, you must halt the user computer, turn off the power and remove the mainframe covers. Accessing the computer card cage from the service side also requires removing a Plexiglas covering from the front of the card cage.

Installation Checklist

Use the following checklist as a guide when you need to remove or install any component.

Checklist for Servicing the ELMA Test Computer

✓	Procedure
Prepare the System	
	Prepare the Computer for Servicing
	Shut Down Using Tip Hardwire
	Removing or Replacing the Mainframe Covers.
	Remove the ELMA Card Cage Cover (if necessary)
	Remove ELMA Test Computer Cabling
Replace Test Computer Components	
	Replacing the CPU-24/VTF Board
	Replacing the 949-634 BIF Board on the CPU-24/VTF
	Replacing the 879-700 TBA Board
	Replacing the 9U-VME/IEEE-488 Interface Board
Reconnect Cables	
	See ELMA Test Computer Cabling
Replace the ELMA Cover	
	Reverse procedure found in Remove the ELMA Card Cage Cover
Replace ELMA Computer Peripherals	
	Replacing the ELMA Test Computer Power Supply
	Replacing the Card Cage Fan Assembly
Replace Test Computer Peripherals	
	Replacing the Terabus Terminator Board
	Replacing the IEEE Bus Extender
	Replacing the Ethernet Hub
Complete the Replacement	
	Completing the Replacement
	Removing or Replacing the Mainframe Covers. See Section 8 of the Catalyst LC Service Manual (553-701-15) to remove LC covers.
	Restart System. See Restarting the System in Software Commands and Tests

✓	Procedure
	Reconfigure Solaris 2. See Reconfigure the Solaris 2 System in Software Commands and Tests.

Prepare the Computer for Servicing

Before installing or removing any component, perform the following steps.

1) Shut down the system. See Shut Down Using Tip Hardwire.
2) Remove mainframe covers. For most computer service, all the right end bay covers need to be removed. See Removing or Replacing the Mainframe Covers.

   Refer to the Catalyst LC Service Manual (pn 553-701-15) procedure for opening the Catalyst LC Mainframe covers.
3) If replacing a board in the ELMA card cage, remove the Plexiglass cover over the card cage. See Remove the ELMA Card Cage Cover.

   If replacing the IEEE Extender or an Ethernet Hub, remove the user power panel next to the ELMA card cage by unscrewing the two screws at the top and bottom of the user power panel.

   If replacing the ELMA power supply or fan assembly, you do not need to remove either the cover or the user power panel.
4) Disconnect the necessary cables, see ELMA Test Computer Cabling.

! Caution

Computer equipment is extremely sensitive to static electricity. Handle boards only by the edges and always wear a ground strap when handling them.

Shut Down Using Tip Hardwire

Use the following procedure to shut down the system.

Do not use `halt_sys` to shut down the system, because the system will hang while looking for the Ethernet address of the old ELMA test computer system that was replaced or upgraded. Since that computer is no longer in the system, the system stalls waiting for that computer to boot. The following procedure allows the system to boot so that you can change the ethernet address once the system is on.

Note

IMAGE versions since V6.3.y2k automatically try to boot the tester regardless of how it is halted. As long as a CPU board is present, these versions will eventually time out.

1) Type `tip hardwire` and press Return.

   This connects you to the ELMA test computer. The monitor displays:

   ```
   Connected

   login:
   ```

2) Log in as `root` and at the password prompt enter the appropriate password.
3) At the `#` prompt, type `halt`
4) At the `ok` prompt, return to the user computer by typing ~ (shift tilde) followed by a `.` (period).
5) At the # prompt, type `halt` and press Return.

   The system comes down, the screen displays the `ok` prompt.
6) Turn off the main power. (The switch is located on the operator side control panel.)

Removing or Replacing the Mainframe Covers

Warning

System mainframe covers must be locked to prevent contact with potentially hazardous voltages.

Refer to the Catalyst LC Service Manual (pn 553-701-15) to remove the mainframe covers from the Catalyst LC.

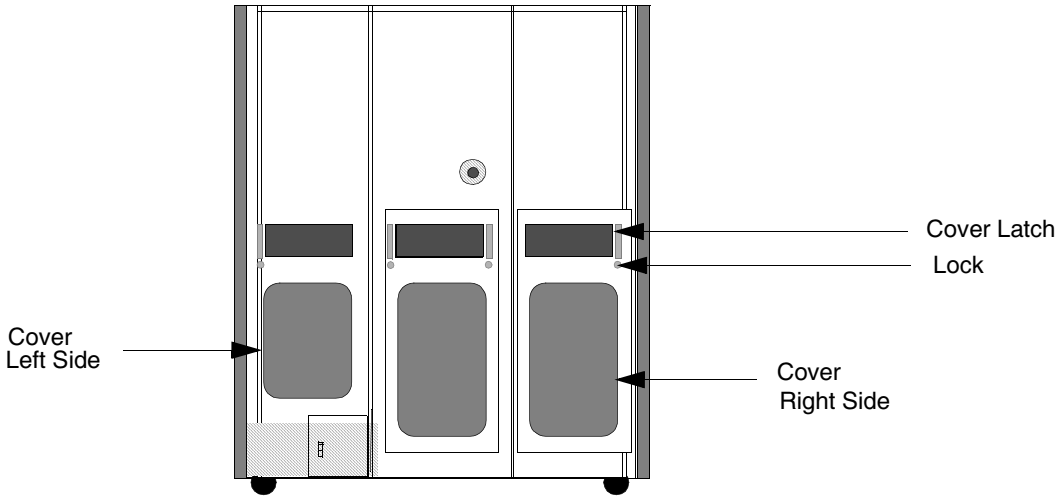
On the Catalyst systems, open the cover latch to remove or replace either the service or operator side covers. Use a six millimeter hex wrench (pn 465-523-00 and 465-522-00) to operate the fastener on the cover latch. Turn the fastener clockwise to release the locked latch handle. See Service Side Covers and Operator Side Covers for latch locations.

Remove or Replace the Service Side Covers

When removing the service side covers, first remove the center cover, then remove either the left or right side covers. See Service Side Covers for a view of the service side covers.

1) Open the cover latch(s).

   Remove the center cover first by lifting the cover straight up to release it from the retainer hooks.
2) Remove the left side cover following the same procedure.
3) Replace the covers following the same procedure in reverse, replacing the center cover last.

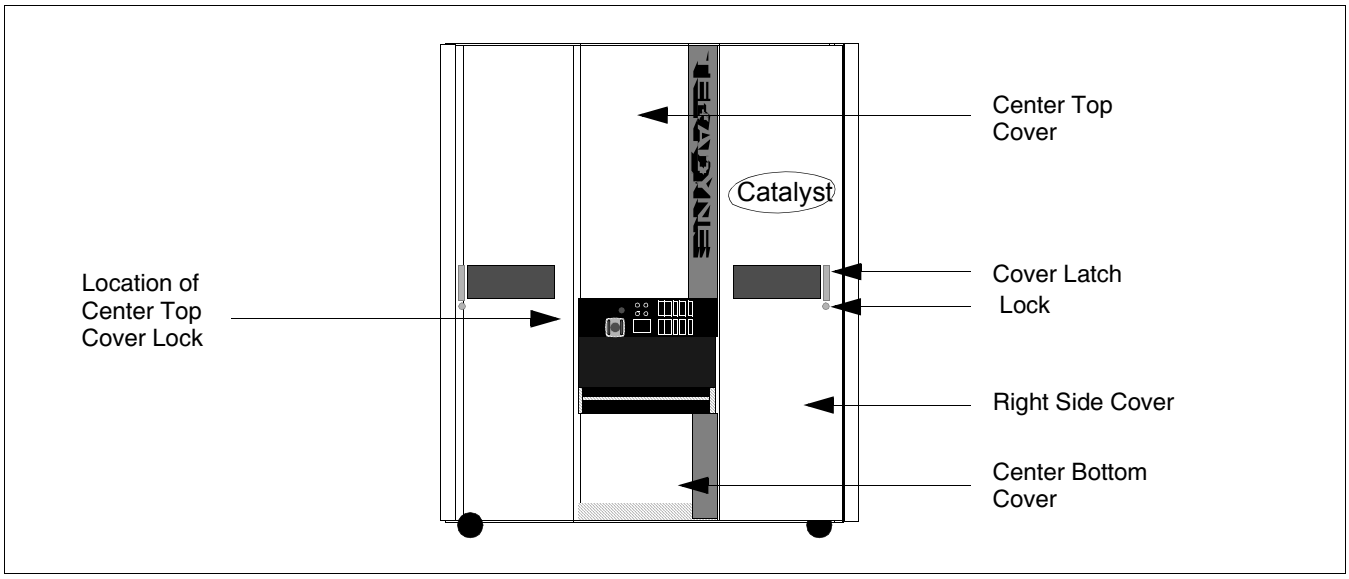


Service Side Covers

Remove or Replace the Operator Side Covers

The center top cover is secured by a 1/4 turn fastener located on the lower left side of the cover. When removing covers from the operator side, you must remove the center top cover first, then the left or right side covers and finally the center bottom cover. See Operator Side Covers.

1) Use the six millimeter hex wrench to turn the 1/4 turn fastener located on the lower left side of the top center cover.
2) Lift the cover straight up, approximately two inches, to release it from the retainer hooks and then remove it from the system.
3) Remove the right cover from the system. Lift the cover straight up to release it from the retainer hooks.
4) Replace the covers following the same procedure in reverse.



Operator Side Covers

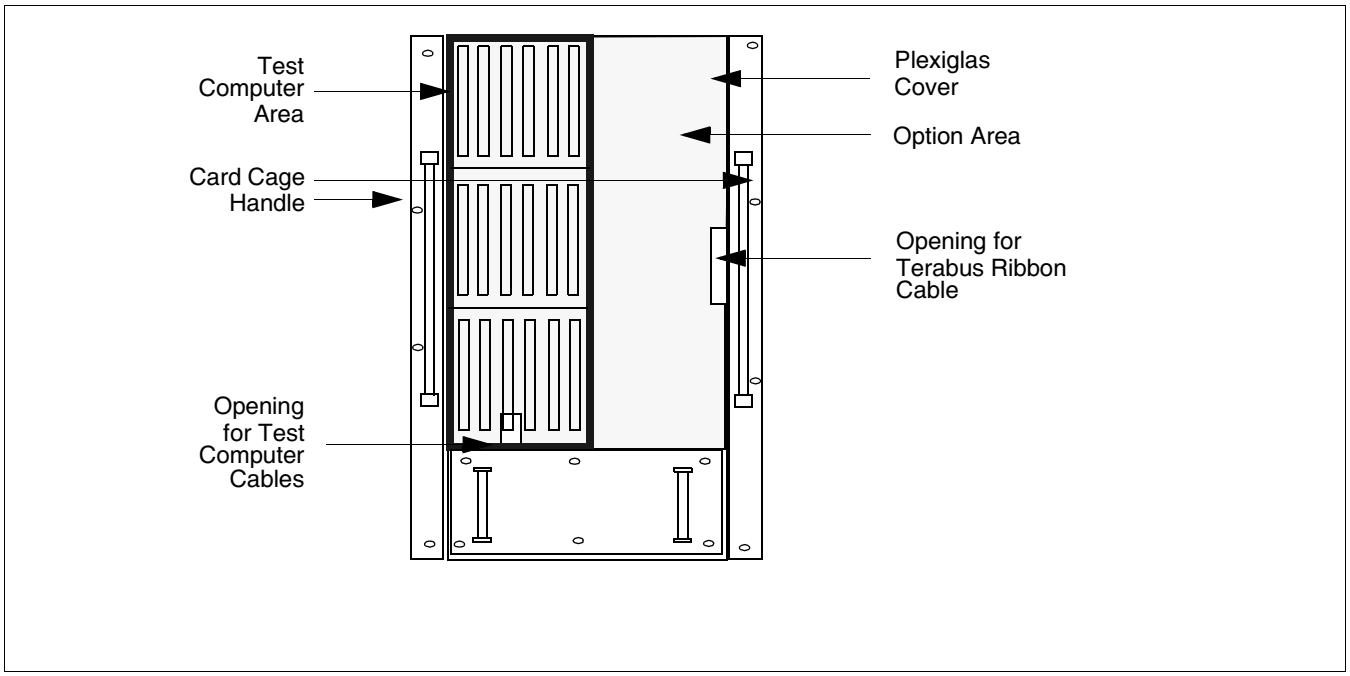
Remove or Replace the End Cover

Under normal circumstances, no service access is required to the end covers of the system because no test instruments are located in this area. However, the bottom right-side end cover must be removed to route cables from the ELMA test computer, through the cable strain relief block, to the user computer.

1) Remove the two screws located at the upper end of the cover.
2) Lift the cover straight up approximately two inches to clear the retainer hooks.
3) Replace the cover following the same procedure in reverse.

Remove the ELMA Card Cage Cover

The card cage has a Plexiglas cover with openings for the Terabus ribbon cable and ELMA test computer cables. To access the card cage and remove boards, the cover needs to be removed first. See Card Cage & Plexiglas Cover (Service Side) for the location of the cover.



Card Cage & Plexiglas Cover (Service Side)

1) Remove the four screws that hold the Plexiglas cover in place.
2) Remove the cover.

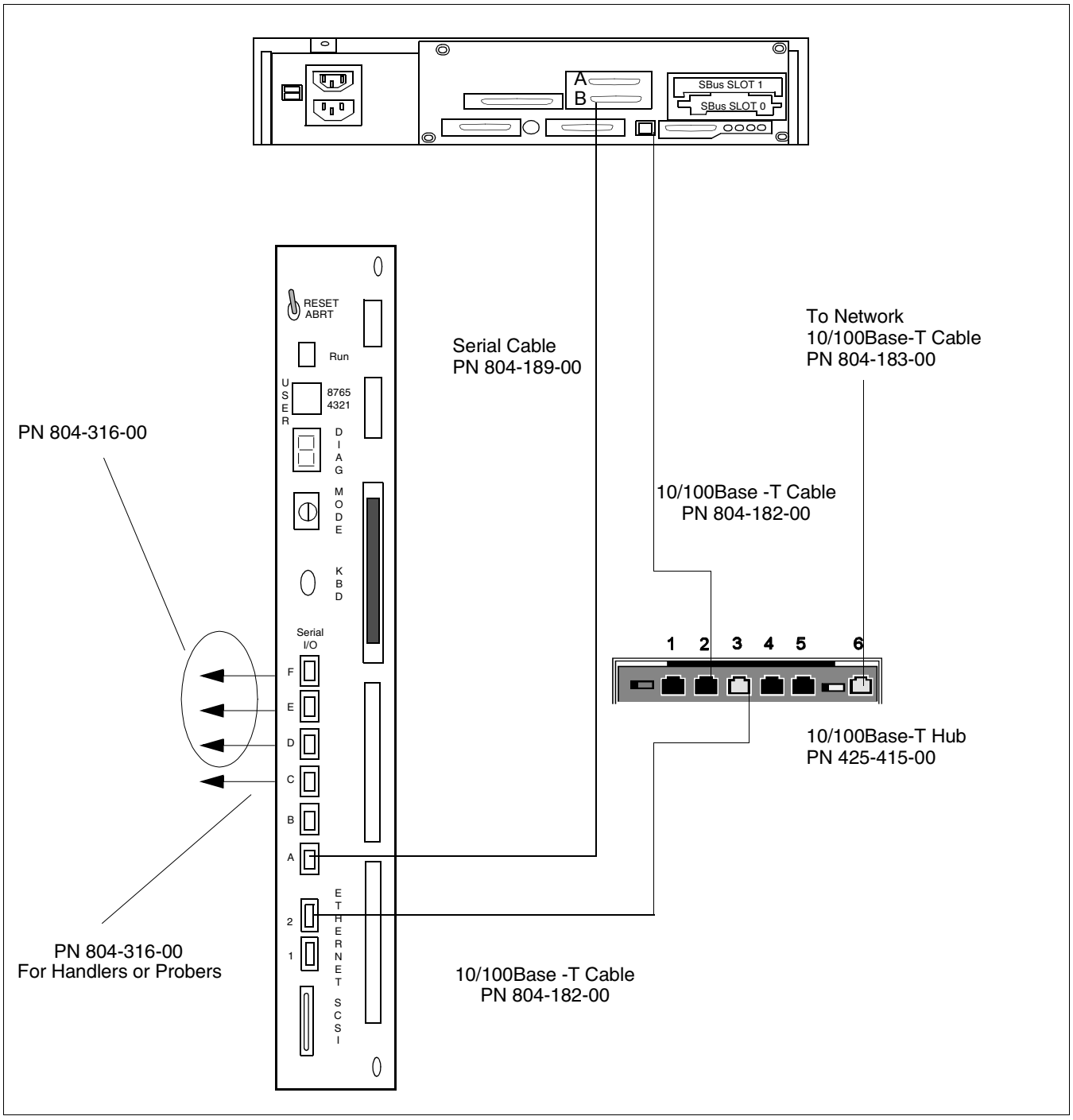
ELMA Test Computer Cabling

The following table and figures provide a synopsis of the ELMA test computer cabling. The figure Computer Subsystem Flow Diagram provides a flow diagram for the computer subsystem. CPU-24/VTF Cabling to User Computer illustrates the cable connections between the user computer, the CPU-24/VTF, and the 10Base-T Ethernet hub. CPU-24/VTF and AD703 Board Cabling shows CPU-24/VTF and Terabus Adapter(TBA) board cabling from the service side. Card Cage Back Panel Cabling shows the card cage back panel cabling.

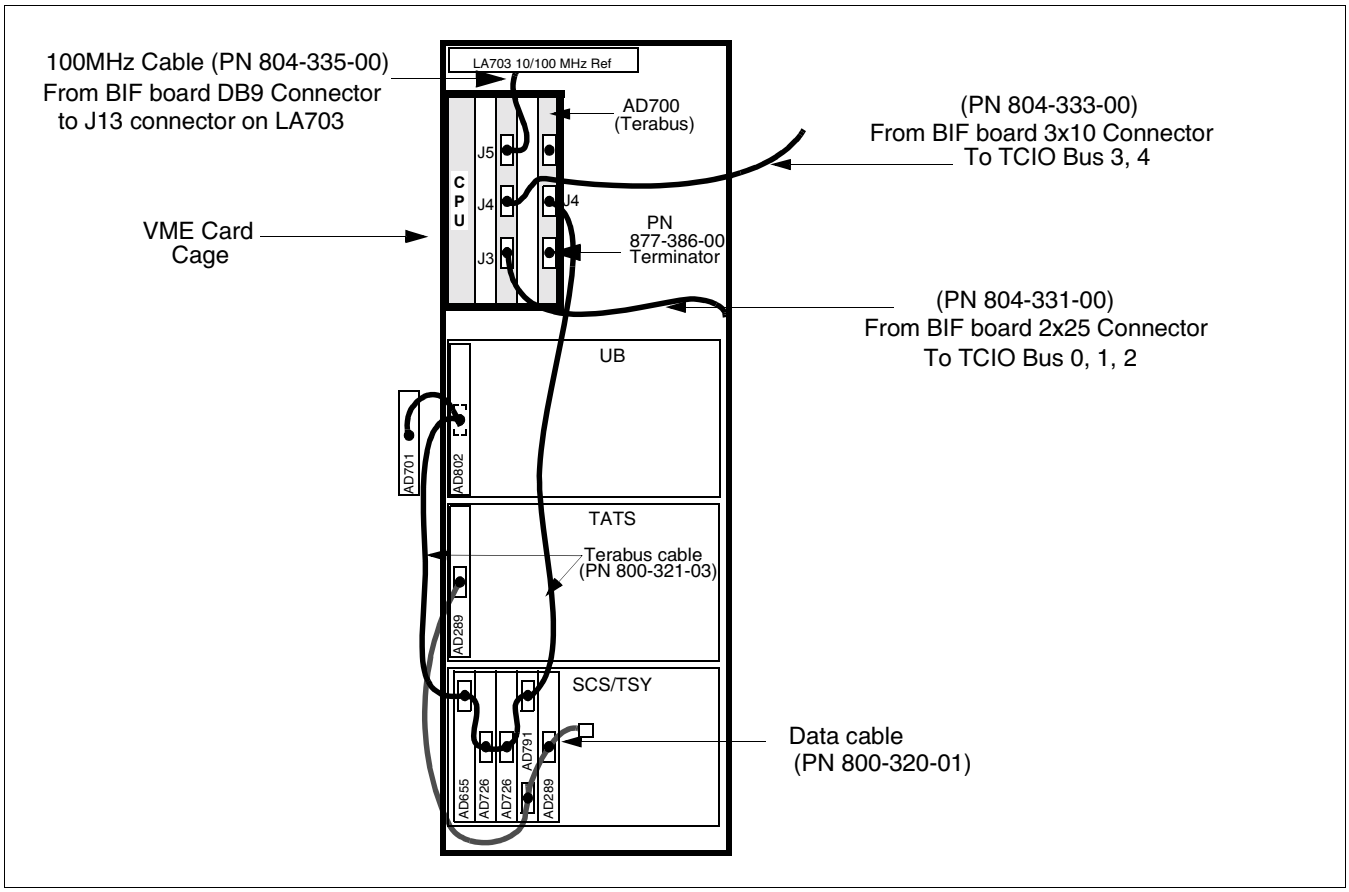
Use the table, ELMA Test Computer Cabling, and the diagrams to disconnect the appropriate cables from the ELMA test computer.

ELMA Test Computer Cabling

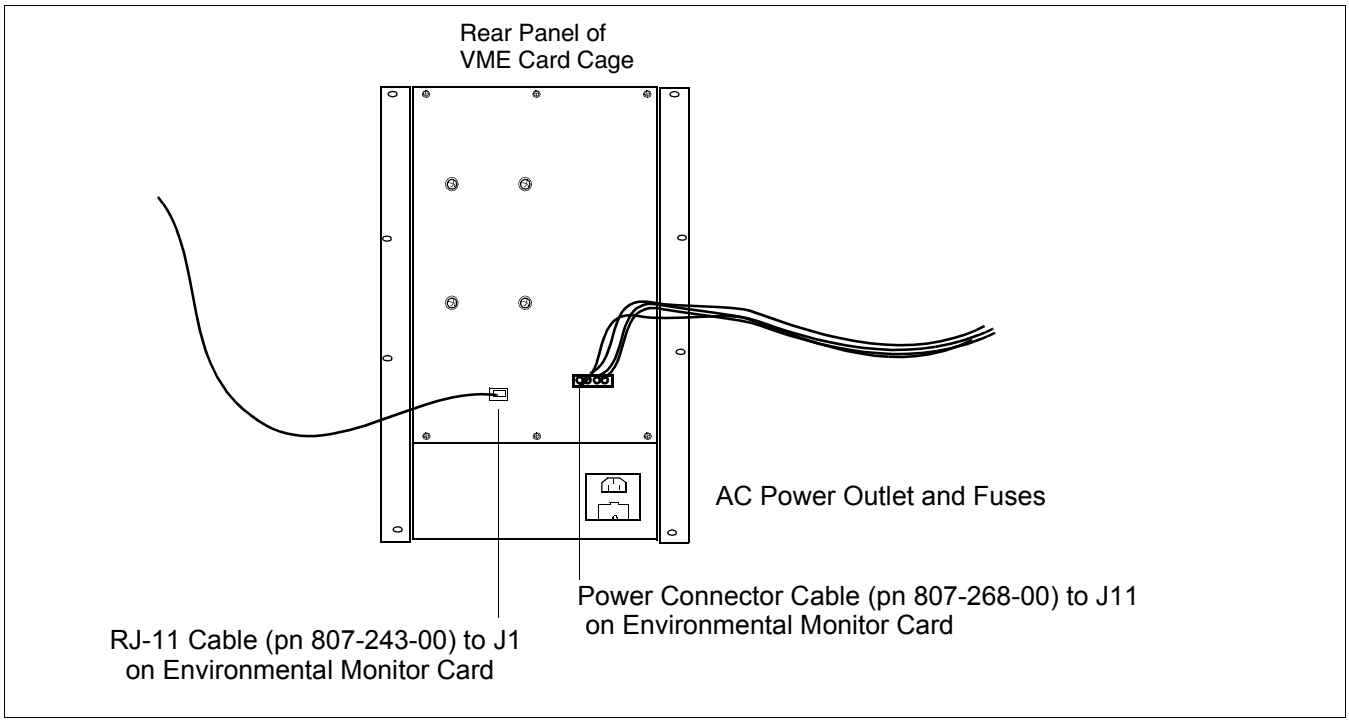
Cable Description	PN	From	To
60 pin ribbon cable	800-321-03	AD700-03 J4	AD791
Power Cable	800-594-00	VME Card Cage Power Connector	Main Vault J9
Twisted pair 10Base-T cable	804-182-00	10Base-T Hub Port	User Computer (on board) Ethernet Port
Twisted pair 10Base-T cable	804-182-01	10Base-T Hub Port	CPU-24/VTF Ethernet Port 1
RS-232 Serial (Tip Hardwire)	804-189-00	CPU-24/VTF Port A	User Computer Port B
RS-232 (x4) For Handlers Probers	804-316-00	CPU-24/VTF Ports B-E	Connection to bulkhead J7-J10
TCIO Data Cable	804-331-00	BIF 2x25 Connector	TCIO Bus 0,1,2
TCIO Data Cable	804-333-00	BIF 3x10 Connector	TCIO Bus 3,4
100 MHz Clock Cable	804-335-00	BIF DB9 Connector	LA703 10/100 MHz Ref J13
Twisted pair cable	806-075-01	10Base-T Hub	Customer Network
RJ-11 fan monitor cable	807-243-00	Card Cage Back Panel	Environmental Monitor Card J1
10/100 MHz Reference Module Cable	807-268-00	Card Cage Mate-n-Lok Connector	Environmental Monitor Card J11
IEEE Cable	877-054-01	IEEE Extender Port B	Bulkhead
Terminator plug	877-386-00	N/A	AD700-03 J3
IEEE-488 Cable	901-088-00	IEEE-488 J1	WIth no option N/A or IEEE Bus Extender Port A
Power Cable		Hub	1st CDM Bay outlet J8 B
Power Cable		IEEE Extender	1st CDM Bay outlet J8 A



CPU-24/VTF Cabling to User Computer



CPU-24/VTF and AD703 Board Cabling


Rear Panel of
VME Card Cage
AC Power Outlet and Fuses
Power Connector Cable (pn 807-268-00) to J11
on Environmental Monitor Card
RJ-11 Cable (pn 807-243-00) to J1
on Environmental Monitor Card

Card Cage Back Panel Cabling

Replacing ELMA Computer Components

The following topics are covered in this section:

- Replacing the CPU-24/VTF Board
- Replacing the 949-634 BIF Board on the CPU-24/VTF
- Replacing the 879-700 TBA Board
- Replacing the 9U-VME/IEEE-488 Interface Board

Replacing the CPU-24/VTF Board

Refer to the section FORCE Computer CPU-24/VTF Board in Physical Description of the Test Computer for a physical description of the CPU-24/VTF board. The CPU-24/VTF with the 949-634 BIF rider board installs vertically in the ELMA test computer card cage in slots 1 and 2.

When installing any of this equipment you need to specify each piece by its unique part number. If you need to increase the CPU-24/VTF memory or processor modules, order the specific board containing the memory or processors.

Caution

Computer equipment is extremely sensitive to static electricity. Handle boards and modules only by the edges and always wear a ground strap when handling them. When replacing or installing computer equipment move the computer to a static free environment.

Remove the CPU-24/VTF

1) Perform the sequence found in Preparing to Replace a Component.
2) Push the flippers on the CPU-24/VTF to pop the board loose.
3) Slide the board out part way to remove the cabling.
4) Remove the cabling. There are 3 sets of cables:

   • 3 BIF cables
   • 1-5 serial cables (labelled A-E)
   • 1 Ethernet cable in port 1

   Make sure to mark any unlabeled cables before removing them.
5) Pull the board completely out and place it in an anti-static bag.
6) Take the board to a static free area to work.
7) Go to Install the CPU-24/VTF.

Install the CPU-24/VTF

Note

When swapping ELMA test computer boards, do not exchange the EEPROM.

1) Swap BIF board from one test computer board to another if necessary. See the section Replacing the 949-634 BIF Board on the CPU-24/VTF.
2) Make sure that the switches on the CPU-24/VTF board are set correctly. Refer to the section CPU-24/VTF Switches in Physical Description of the Test Computer.
3) Slide the board part way in the cage to attach the cables.
4) Push the board all the way in to the back edge of the cage and push the flippers up in the locked position.
5) Screw the computer board in.
6) Perform the procedure in the section Completing the Replacement.
7) Log in.
8) Change Ethernet address.
9) Boot test computer. See Reboot After Installing an ELMA Card Cage Board in Software Commands and Tests.
10) Run checkers.

Replacing the 949-634 BIF Board on the CPU-24/VTF

Use this procedure if you are:

- Replacing a CPU-24/VTF with the BIF already installed
- Upgrading a CPU-24/VTF to include a BIF board

See Bus Interface (BIF) Board in Physical Description of the Test Computer for a physical description of the BIF board.

Remove the BIF Board from the CPU-24/VTF

Refer to the figure CPU-24/VTF and BIF Boards for this procedure.

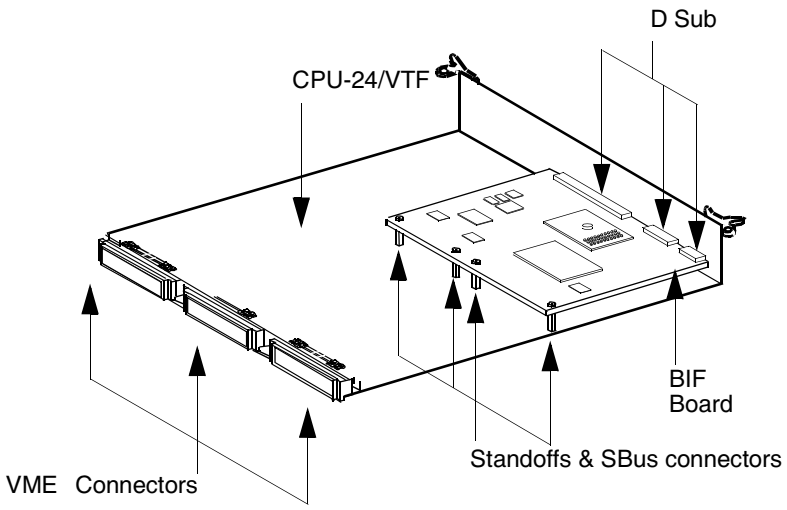
1) Perform the sequence found in Preparing to Replace a Component.
2) Remove the CPU-24/VTF board, see Remove the CPU-24/VTF.
3) Place the test computer board and/or BIF board on a static free surface.
4) Remove the four screws at the perimeter of the BIF board.
5) Remove the six screws from the front panel.

   Four screws are threaded directly into the board, while two others are threaded into hex nuts with washers. Make sure to save the screws, nuts, and washers.
6) Lift the back edge of the board (where the BIF board slides into the SBus connectors) and gently rock the board back and forth until it clears the SBus connectors and you can pull it out.
7) Go to Install the BIF Board on the CPU-24/VTF.

Install the BIF Board on the CPU-24/VTF

Refer to the figure CPU-24/VTF and BIF Boards for this procedure.

1) Place the test computer board and BIF board on a static free surface.
2) If you are installing a new test computer board, then remove the four standoff extensions near the SBus connector (two on each connector) from the old test computer board and install them on the new test computer board. (The standoff extensions are used to hold the BIF board in place.)
3) Take the BIF board (new or swap) and insert the D Subs into the cutouts.
4) Align SBus connectors to SBus sockets and gently push in to place.
5) Install one screw on the BIF board to hold it in place.
6) Install the six screws on the front panel.
7) Install the remaining three screws on the BIF board.
8) If replacing a test computer board, install the face plates onto the test computer board that is being returned or replaced.
9) Go to Install the CPU-24/VTF to replace the test computer board.



CPU-24/VTF and BIF Boards

Replacing the 879-700 TBA Board

See 879-700-03 TBA Board in Physical Description of the Test Computer for a physical description of the Terabus adaptor board.

! Caution

Computer equipment is extremely sensitive to static electricity. Handle boards and modules only by the edges and always wear a ground strap when handling them. When replacing or installing computer equipment, move the computer to a static free environment.

Remove the 879-700 TBA Board

1) Perform the sequence found in Preparing to Replace a Component.
2) Push and pull on the red flippers found on the insertion board to pop the board loose.
3) Slide the board out part way to remove the cabling.
4) Disconnect the 60 pin ribbon cable (pn 800-321-03) from J4 and unplug the terminator plug (pn 877-386-00) from J3.
5) Pull the board completely out and place it in an anti-static bag.
6) If installing a new TBA board, follow the procedure in Install the 879-700 TBA Board.
7) Go to Install the 879-700 TBA Board.

Install the 879-700 TBA Board

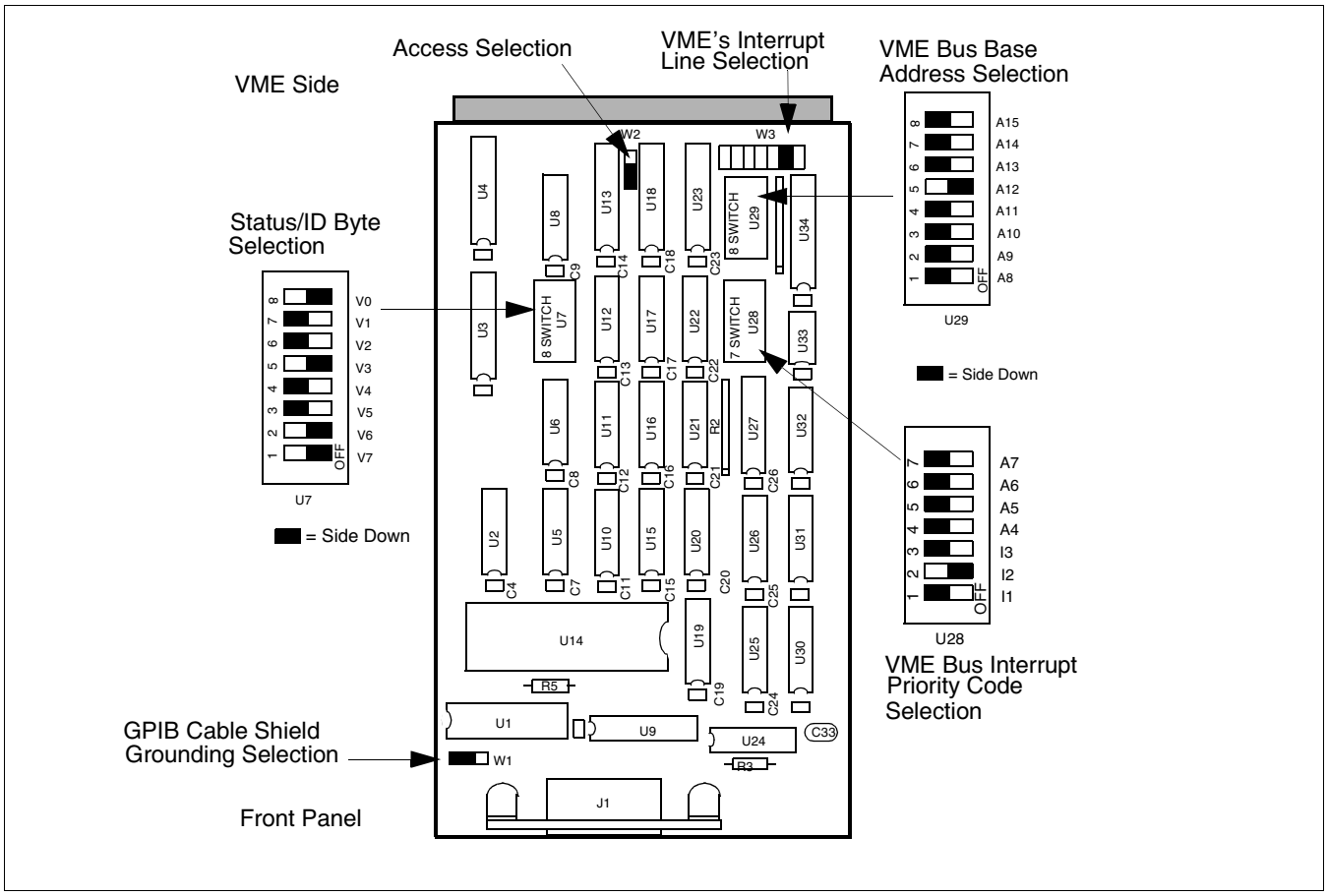
1) Remove TBA board from anti-static bag.
2) Slide the new board part way into the card cage.
3) Plug the cable (pn 800-321-03) into connector J4 and the terminator plug (pn 877-386-00) into connector J3.
4) Slide the board all the way into the card cage and lock the flippers.
5) If you do not need to replace any other components, go to the section Completing the Replacement.

Replacing the 9U-VME/IEEE-488 Interface Board

Refer to GPIB-488 Board in Physical Description of the Test Computer for a physical description of the IEEE-488 Interface board. Because the IEEE board is a 3U board, a third the size of the CPU-24/VTF, the IEEE board kit comes with a 9U adapter frame that allows the board to fit securely in the card cage.

Before the VME/IEEE-488 interface module is installed, certain switches and jumpers must be set to configure the module (see the figure IEEE Module Pre-Installation Dip Switch Settings for the switch settings and board layout). The following must be configured with hardware jumpers or switches prior to installation:

- Privileged access - can be configured to privileged or non-privileged access. (configured for non-privileged access)
- VME bus addressing - configured for base address of 0X1000 (hex).
- Interrupt request line - the VME bus provides seven interrupt request lines; IRQ7* to IRQ1 (configured for IR2*).
- Interrupt priority code - used to identify an interrupt acknowledge cycle intended for the GPIB.
- Status/ID Byte - provided by the GPIB during an interrupt acknowledge cycle.
- GPIB cable shield (Grounded or Isolated) - the cable shield connects to the chassis ground but may also connect to the system logic ground if desired (configured in the isolated ground configuration).



IEEE Module Pre-Installation Dip Switch Settings

! Caution

Computer equipment is extremely sensitive to static electricity. Handle boards and modules only by the edges and always wear a ground strap when handling them. When replacing or installing computer equipment, move the computer to a static free environment.

Remove the IEEE-488 Board

Refer to the table IEEE Cabling and the section ELMA Test Computer Cabling for information on routing the cable pn 901-088-00 from the IEEE-488 board to the appropriate equipment.

1) Perform the sequence found in Preparing to Replace a Component.
2) Push and pull on the red flippers found on the insertion board to pop the board loose.
3) Slide the board out part way to remove the cable.
4) Disconnect the cable (pn 901-088-00) from the J1 connector on the board.
5) Pull the board completely out

6) Remove the card from the insertion board.
7) Place it in an anti-static bag.
8) Go to Install the IEEE-488 Board.

IEEE Cabling

Option	Cable From:	Cable To:
None	IEEE J1	N/A
IEEE Bus Extender		Port A of IEEE-Bus Extender
PMM		PMM
IEEE-Bus Extender & PMM		Port A of IEEE-Bus Extender

Install the IEEE-488 Board

1) Perform the sequence found in Preparing to Replace a Component.
2) Install the new card onto the insertion board.
3) Slide the new board in part way.
4) Reconnect the cable (pn 901-088-00) to the J1 connector on the board.
5) Slide the board all the way into the card cage and lock the flippers.
6) If you do not need to replace any other components, go to the section Completing the Replacement.

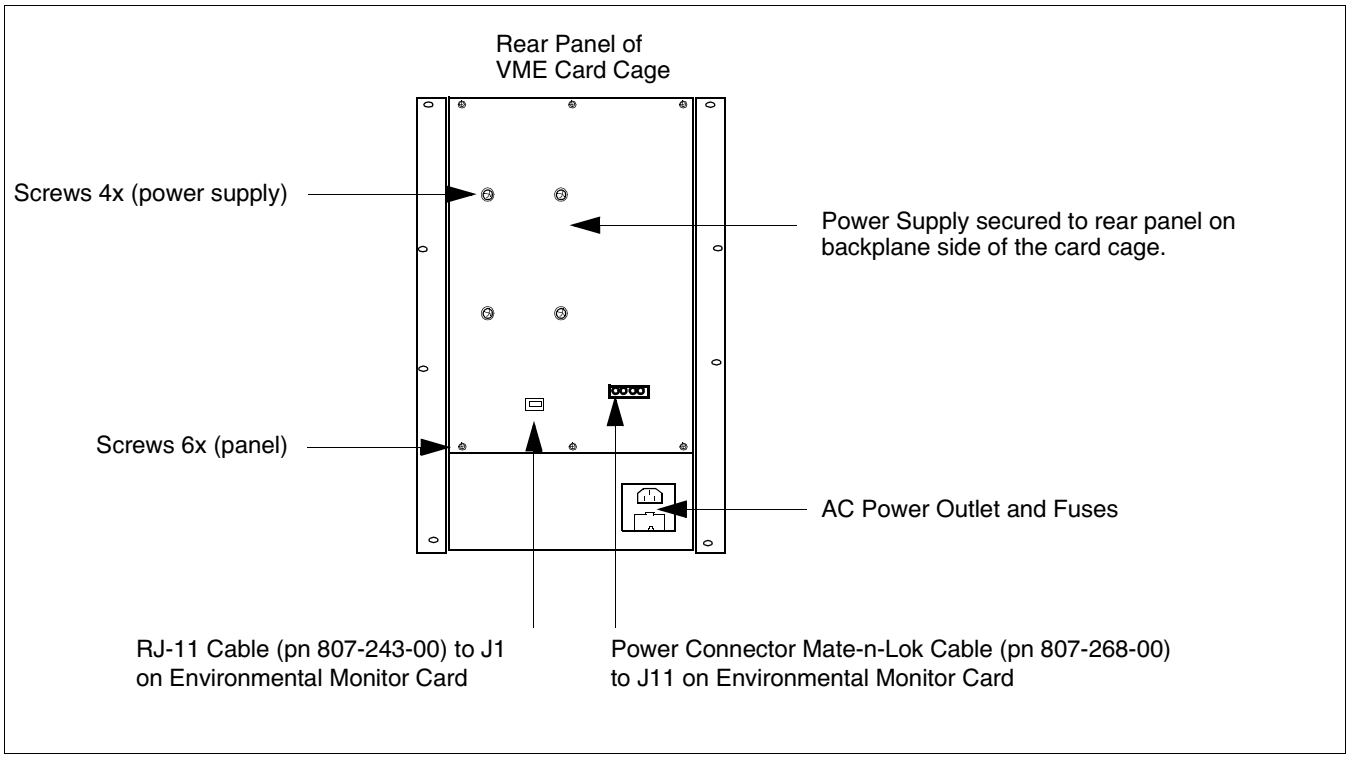
Replacing ELMA Peripherals

The following peripherals are unique to the ELMA card cage:

- Replacing the ELMA Test Computer Power Supply
- Replacing the Card Cage Fan Assembly

Replacing the ELMA Test Computer Power Supply

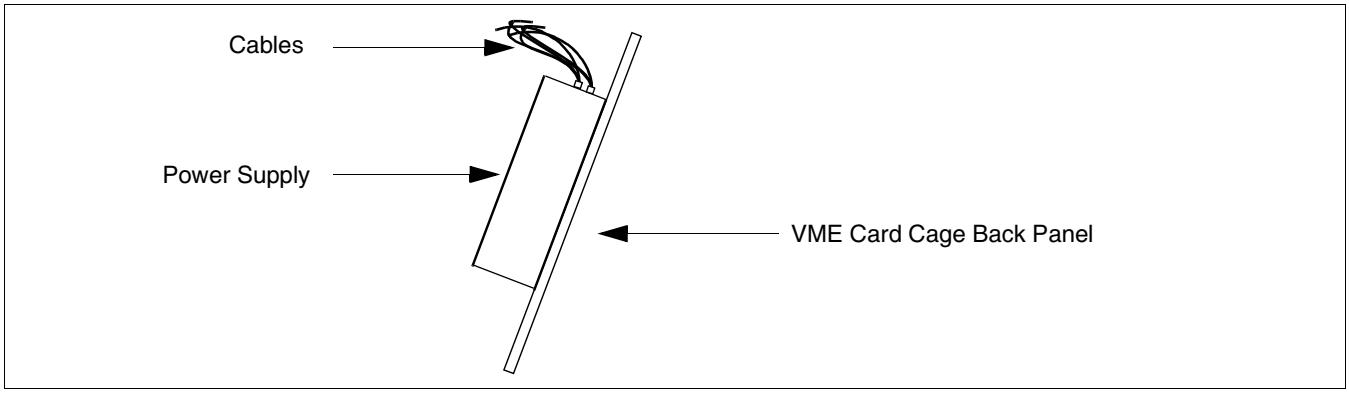
The power supply is a single unit secured to the rear panel on the backplane side of the card cage. See Location of Card Cage Power Supply. Fuses for the card cage and power supply are located within the housing for the outlet. To install the power supply see the next section, to install fuses see Install the Fuse.


Rear Panel of
VME Card Cage
Screws 4x (power supply)
Power Supply secured to rear panel on
backplane side of the card cage.
Screws 6x (panel)
AC Power Outlet and Fuses
RJ-11 Cable (pn 807-243-00) to J1
on Environmental Monitor Card
Power Connector Mate-n-Lok Cable (pn 807-268-00)
to J11 on Environmental Monitor Card

Location of Card Cage Power Supply

Remove the Power Supply

1) Perform the procedure found in Preparing to Replace a Component.
2) Unplug the power cable from VME outlet.
3) Unplug the two cables (pn 807-243-00 and pn 807-268-00) from the back of the card cage.
4) Loosen the six screws (6) securing the back cover of the cage. Make sure to hold onto the cover while unscrewing it.
5) Tilt the panel out. Cables are attached at the top of the power supply and need to be disconnected before you can remove the back panel. See Back Panel with Power Supply.



Back Panel with Power Supply

6) Disconnect cables from the top of the power supply. (To see the cables and the screws holding them in place, you may need to stand on a stool.)
7) Remove the four screws and isolation washers securing the power supply assembly to the panel. See Location of Card Cage Power Supply.
8) Eject all cards from the card cage before applying the power.
9) After installing the new power supply, measure the power supply voltages. (See the next section for the procedure on measuring voltages.)
10) Reseat the boards.
11) If you do not need to replace any other components, go to the section Completing the Replacement.

Install the Power Supply

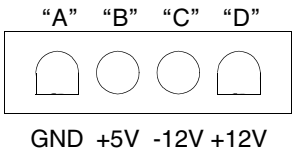
To install the new power supply, reverse the procedure in Remove the Power Supply. Make sure to install the isolation washers correctly.

Measure the Power Supply Voltages

Use a multimeter to verify that no shorts exist between backplane voltages. The cable that plugs into this connector is pn 807-268-00. Refer to the table Power Supply Voltages for the power supply voltages and Card Cage Back Panel Connector for a picture of the power connector.

Power Supply Voltages

Terminal	Nominal Voltage	Hi/Low	Ripple
“A”	Ground	Reference	
“B”	+5V dc	+5.25V/+4.825V	50mv
“C”	-12V dc power	+12.600V/+11.400V	120mv
“D”	+12V dc power	-11.400V/-12.600V	120mv



Card Cage Back Panel Connector

Install the Fuse

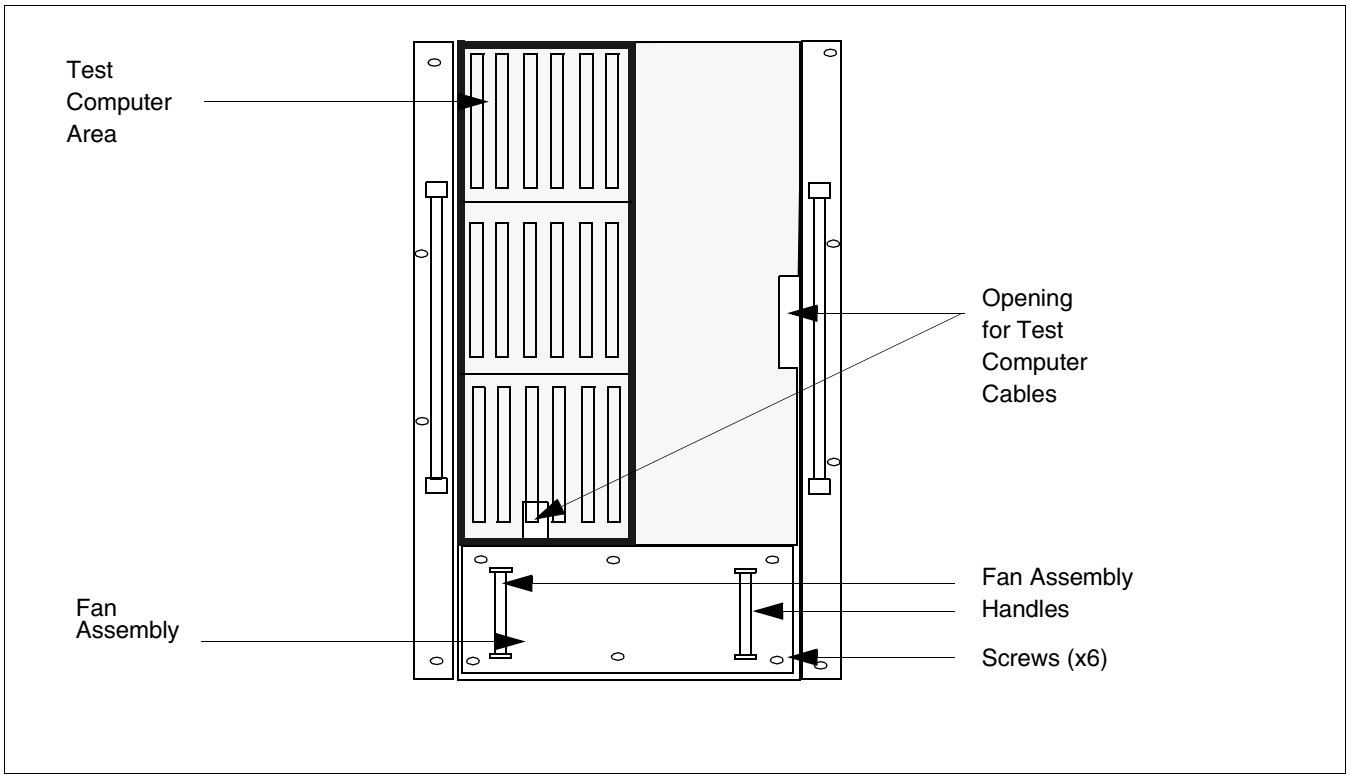
The fuse box for the VME card cage is located beneath the AC power cord outlet. See Location of Card Cage Power Supply.

1) Use a small flat-head screw driver as a wedge to open the cover of the fuse box.
2) Pull out the fuses with the flat-head screw driver.
3) Insert the new fuses, pn 523-009-00 (8A, 250V, 3AG, Slo-Blo).
4) Pop the cover back on.

Replacing the Card Cage Fan Assembly

The fans for the ELMA test computer are housed in a single removable tray. The assembly is located at the bottom of the VME card cage as shown in Fan Assembly Tray Location. To remove the tray assembly:

1) Perform the procedure found in Preparing to Replace a Component.
2) Remove the six screws that secure the assembly in the card cage from the service side of the mainframe.
3) Pull the assembly out part way and detach the cable connecting the assembly and the card cage.
4) Remove the fan assembly.
5) Slide in new fan assembly tray and connect cables.
6) Secure the assembly to the card cage with the six screws removed in Step 2.
7) If you do not need to replace any other components, go to the section Completing the Replacement.



Fan Assembly Tray Location

Replacing Test Computer Peripherals

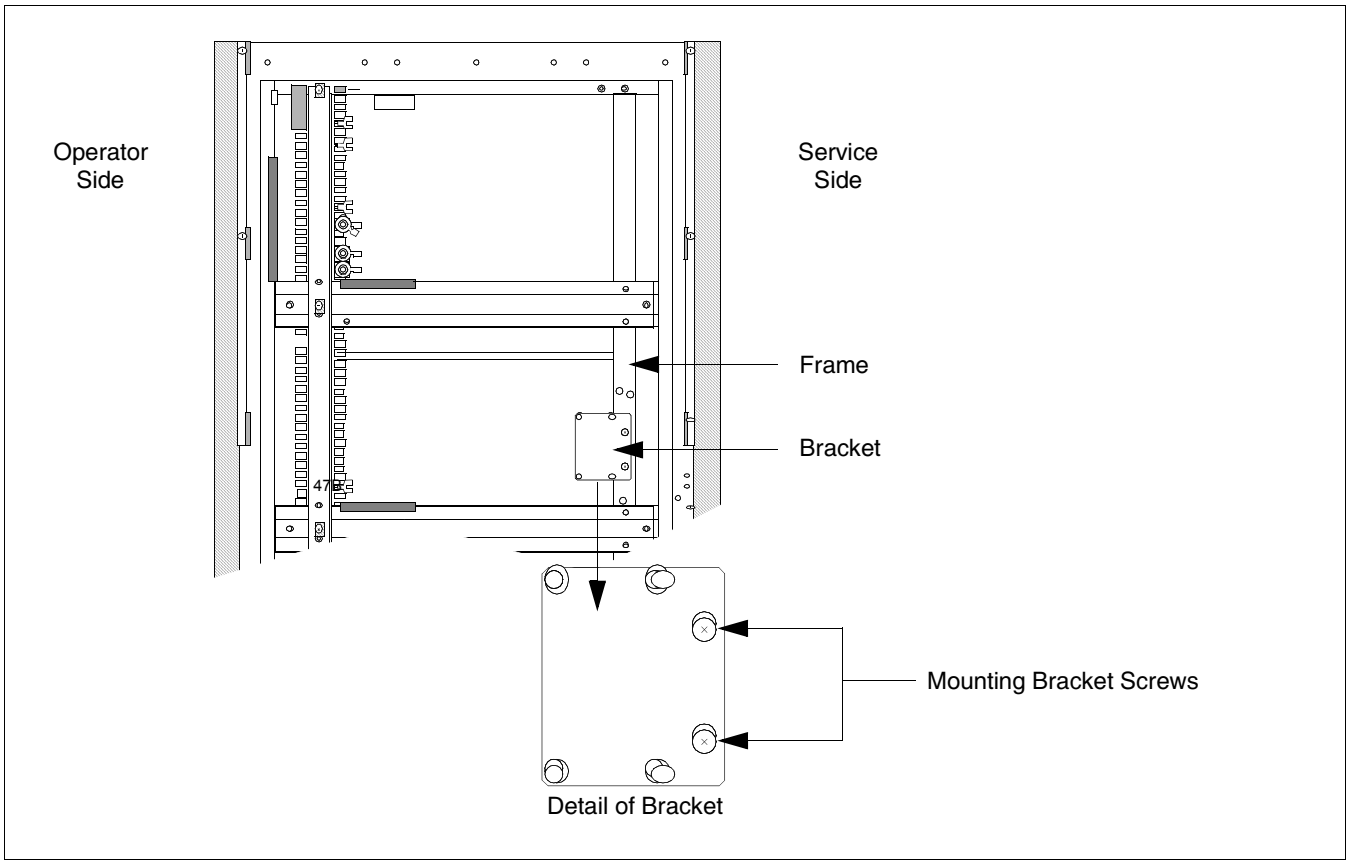
The following peripherals are part of the test computer subsystem no matter what computer is installed:

- Replacing the Terabus Terminator Board
- Replacing the IEEE Bus Extender
- Replacing the Ethernet Hub

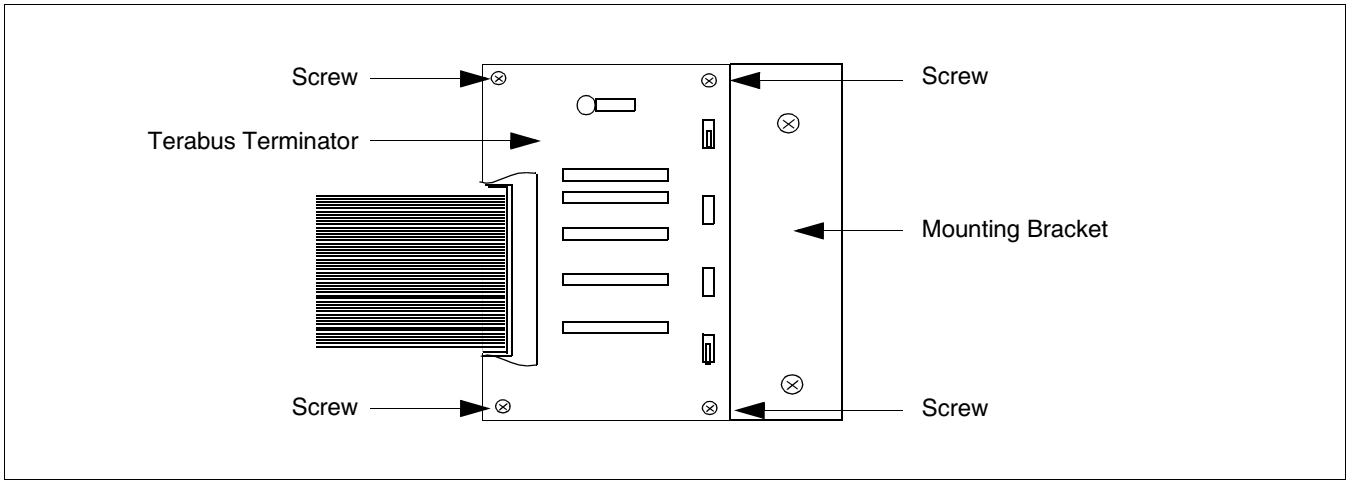
Replacing the Terabus Terminator Board

See Terabus Terminator Board in Physical Description of the Test Computer for a physical description of the Terabus terminator board.

1) Perform the sequence found in Preparing to Replace a Component.
2) Mount the 879-701-00 mounting bracket to the side of the frame using two (2) screws. See 879-701-00 Mounting Bracket.
3) Mount the AD701 Terabus terminator board to the bracket using four (4) screws. See Terabus Terminator Mounted on Bracket.
4) Attach cables.
5) If you do not need to replace any other components, go to the section Completing the Replacement.



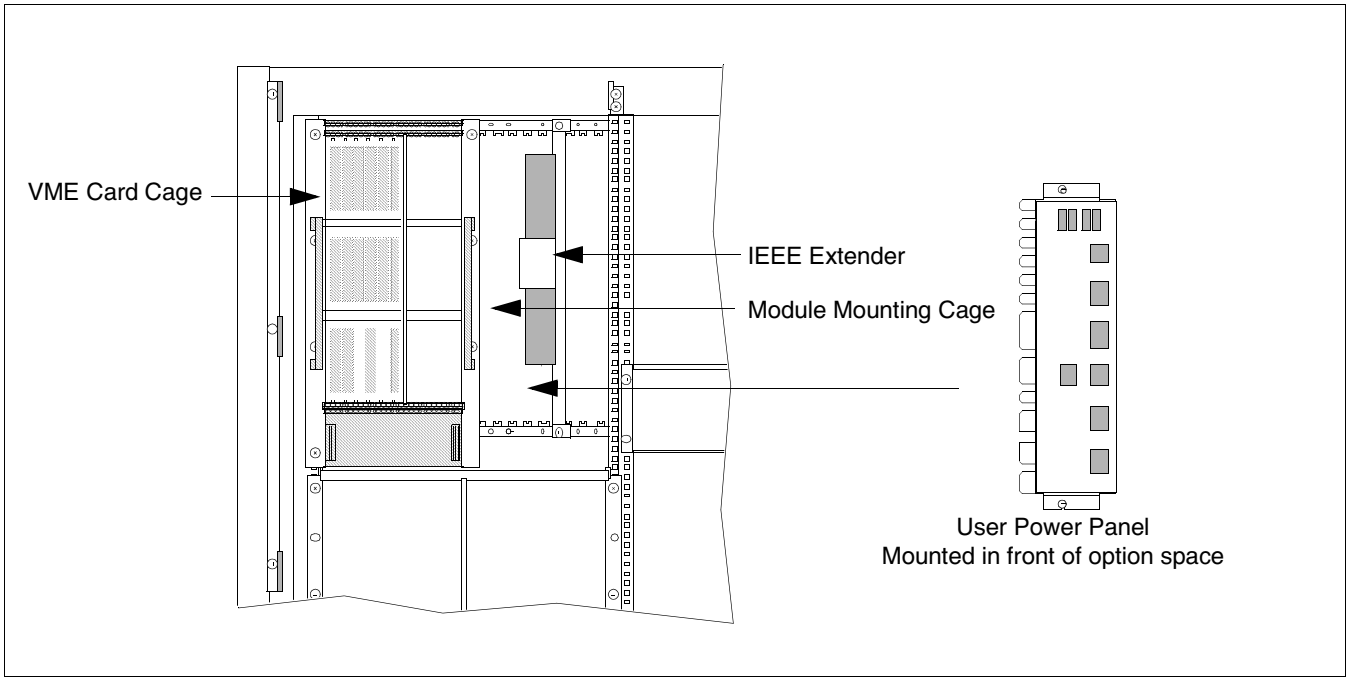
879-701-00 Mounting Bracket



Terabus Terminator Mounted on Bracket

Replacing the IEEE Bus Extender

To install or service the IEEE bus extender from the service side, you need to remove the user power panel mounted in front of the option space. See Location of IEEE Extender. Also refer to GPIB Bus Extender Option in Physical Description of the Test Computer for a physical description of the IEEE bus extender.



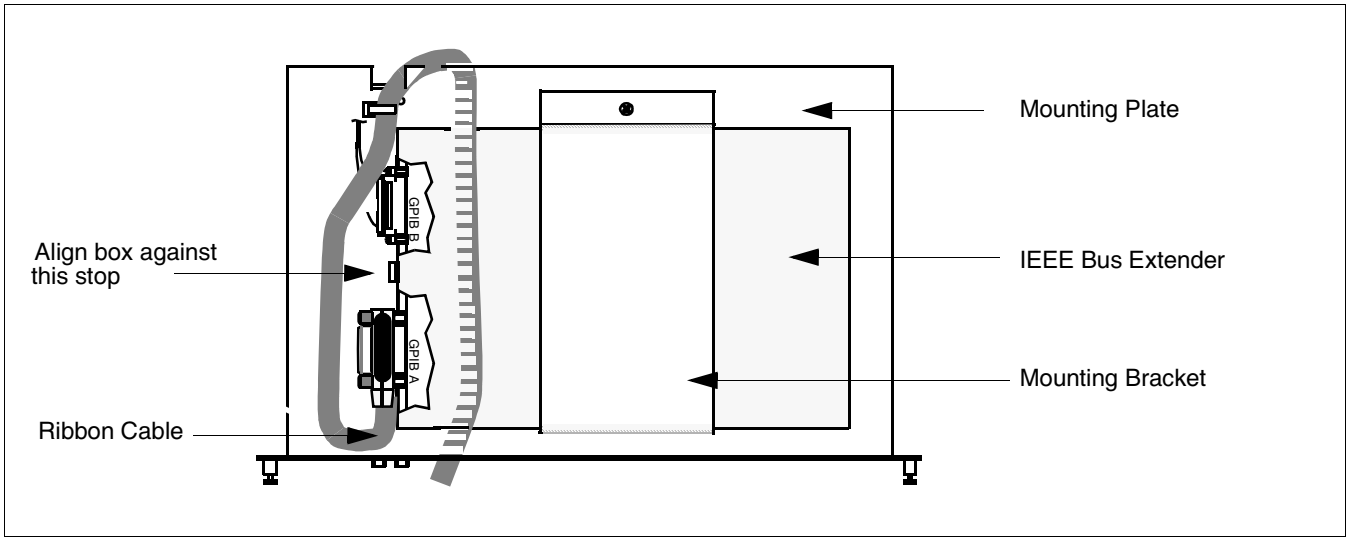
Location of IEEE Extender

Remove the IEEE Bus Extender

To remove the IEEE bus extender, reverse the procedure found in Install the IEEE Bus Extender.

Install the IEEE Bus Extender

1) Perform procedure found in Preparing to Replace a Component.
2) Mount the IEEE Bus Extender to the plate with the bracket as shown in IEEE Bus Extender and Mounting Assembly. Note location of the GPIB connectors on the front of the unit. The unit should be aligned against the stop at the front of the bracket.
3) Connect the proper end of the AC power cord to the input connector on the front of the unit. The input connector is adjacent to GPIB A.
4) Connect the ribbon cable (pn 877-054-01) to Port B as shown in IEEE Bus Extender and Mounting Assembly.
5) Connect cable (pn 901-088-00) to Port A.
6) Slide the IEEE assembly into slot 5 of the module mounting cage from the service side.



IEEE Bus Extender and Mounting Assembly

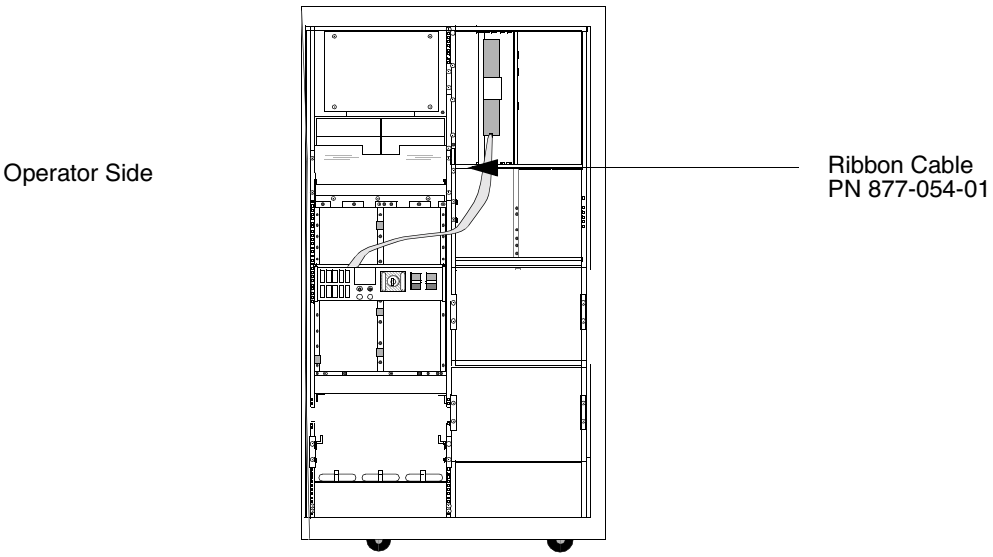
7) Route the ribbon cable to the rear of the operator side control panel and mount to connector J6 on the front of the panel. See Ribbon Cable Routing.

8) Route cable (pn 901-088-00) to the IEEE-488 board and connect to J1.

9) Route the AC power cord out of the module cage on the service side, over the UB card cage to the power vault.

10) Connect the AC power cord to the main power outlet J10 in the vault at the bottom of the bay.

11) If you do not need to replace any other components, go to the section Completing the Replacement.



Ribbon Cable Routing

Replacing the Ethernet Hub

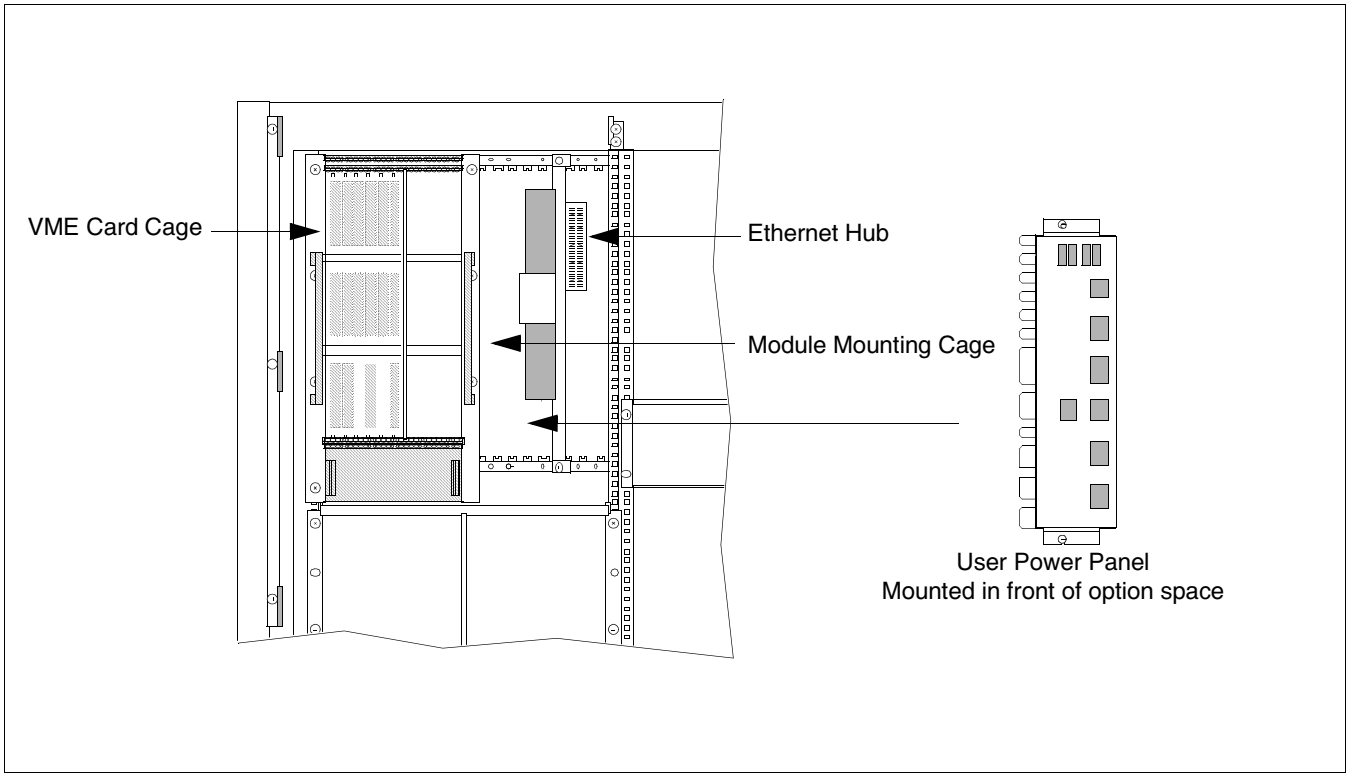
The Catalyst system uses either a 10Base-T or 10/100Base T or 10/100/1000BaseT-Ethernet switching hub. See Network Equipment (Ethernet Hub) in Networking Description for a physical description of both Ethernet Hub. See Types of Configurations for a description of the different possible network configurations and Ethernet hub connections.

This topic contains the following subtopics:

- Remove the 10Base-T Hub
- Install the 10Base-T Hub
- Remove the 10/100Base-T Hub
- Install the 10/100Base-T Hub
- Removing the NETGEAR 10/100/1000 Ethernet Switch
- Installing the NETGEAR 10/100/1000 Ethernet Switch

Remove the 10Base-T Hub

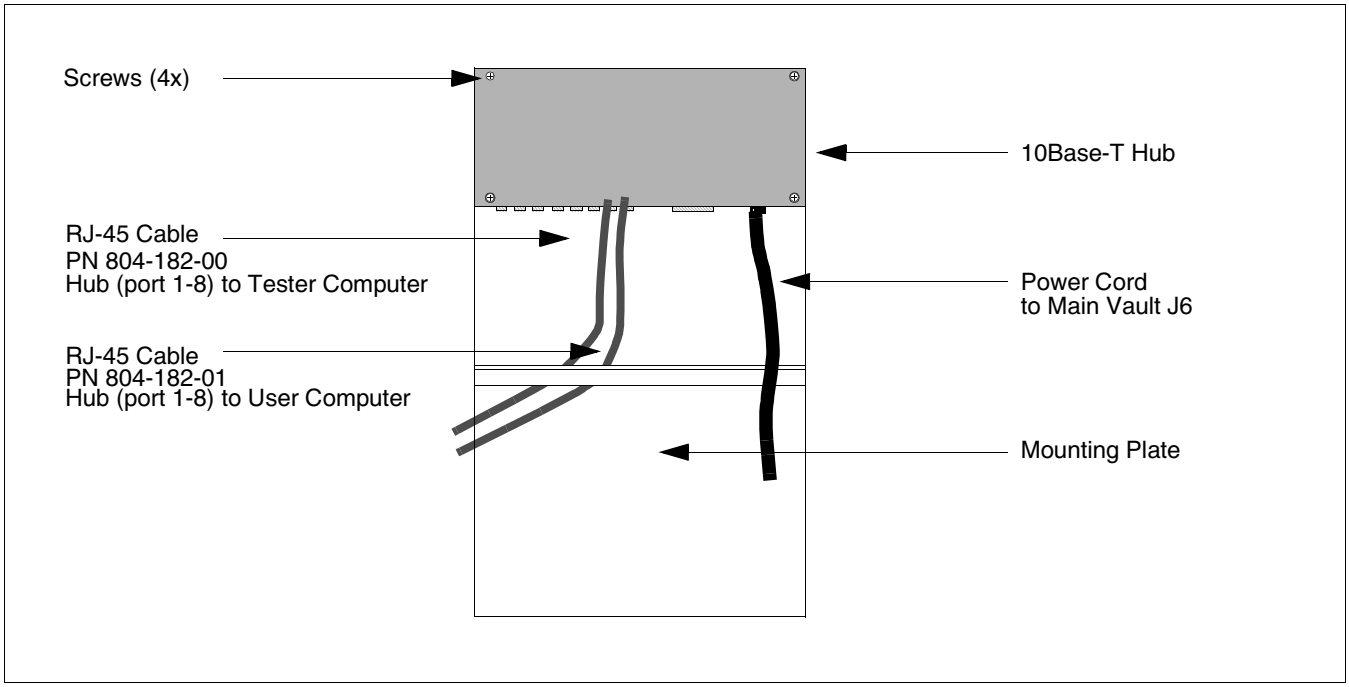
To remove the 10Base-T Ethernet hub, reverse the procedure found in Install the 10Base-T Hub. To install or service the 10Base-T hub from the service side, you need to remove the user power panel mounted in front of the option space. See Ethernet Hub Location.



Ethernet Hub Location

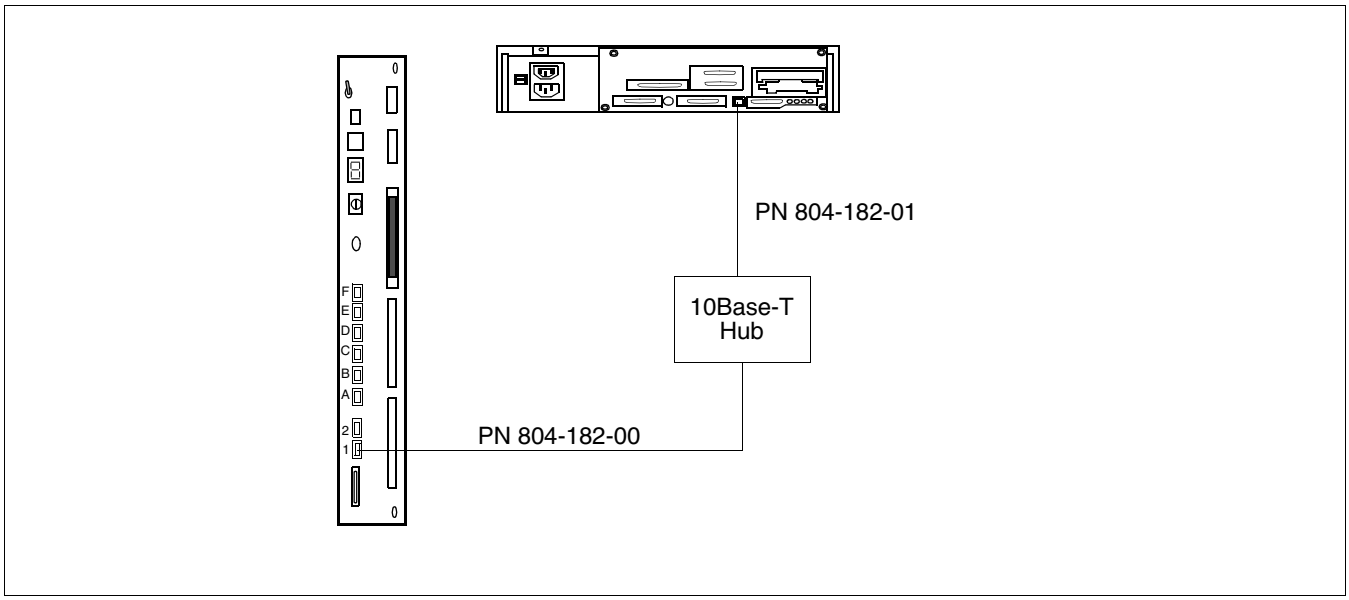
Install the 10Base-T Hub

1) Perform the procedure found in Preparing to Replace a Component.
2) Mount the 10Base-T hub to the plate with four screws as shown in 10Base-T Hub Mounting Assembly.
3) Connect the proper end of the AC power cord to the input connector on the hub and route the other end to the main power outlet J6 in the vault at the bottom of the bay.
4) Connect cable pn 804-182-00 (RJ-45) to hub port 7 or 8 and the other end to the CPU-24/VTF Ethernet 1 port. See 10Base- T Hub Cabling.
5) Connect cable pn 804-182-01 (RJ-45) to hub port 7 or 8 and the other end to the User Computer Ethernet port. See 10Base- T Hub Cabling.



10Base-T Hub Mounting Assembly

6) If you do not need to replace any other components, go to the section Completing the Replacement.



10Base- T Hub Cabling

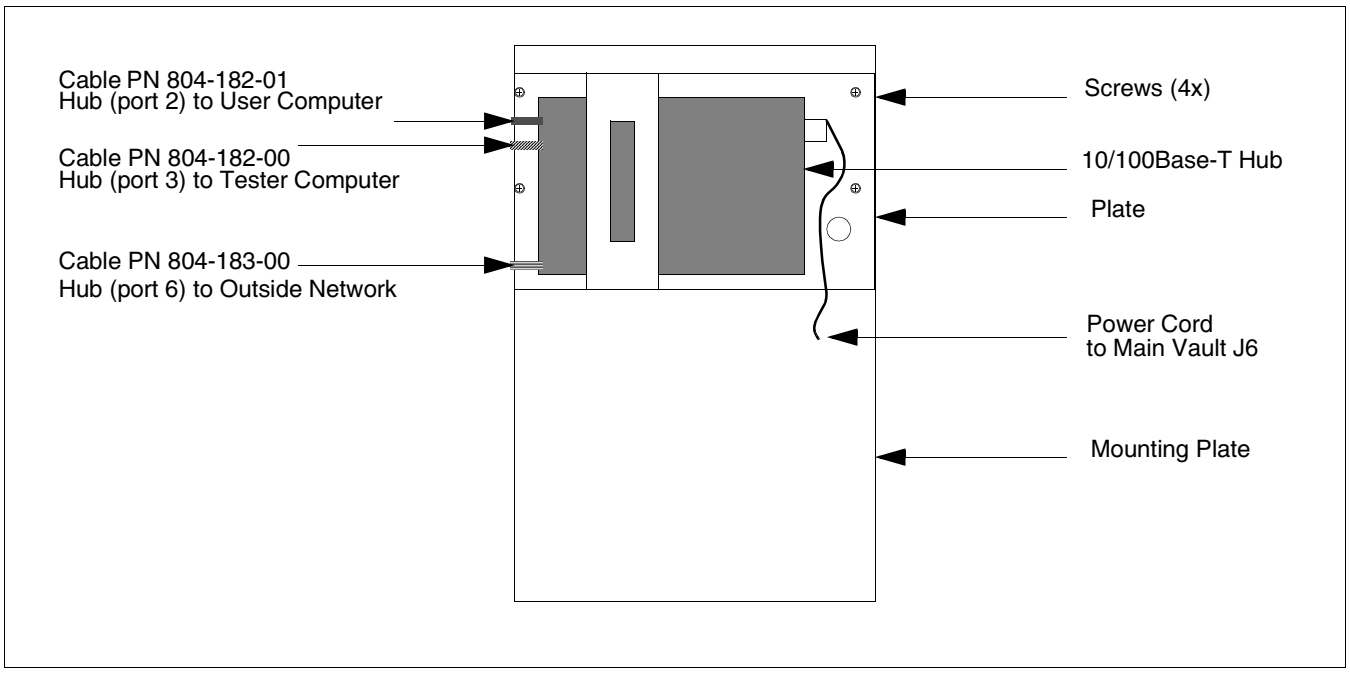
Remove the 10/100Base-T Hub

To remove the 10Base-T Ethernet hub, reverse the procedure found in Install the 10/100Base-T Hub.

To install or service the 10/100Base-T Ethernet switching hub from the service side, you need to remove the user power panel mounted in front of the option space. See the figure Ethernet Hub Location.

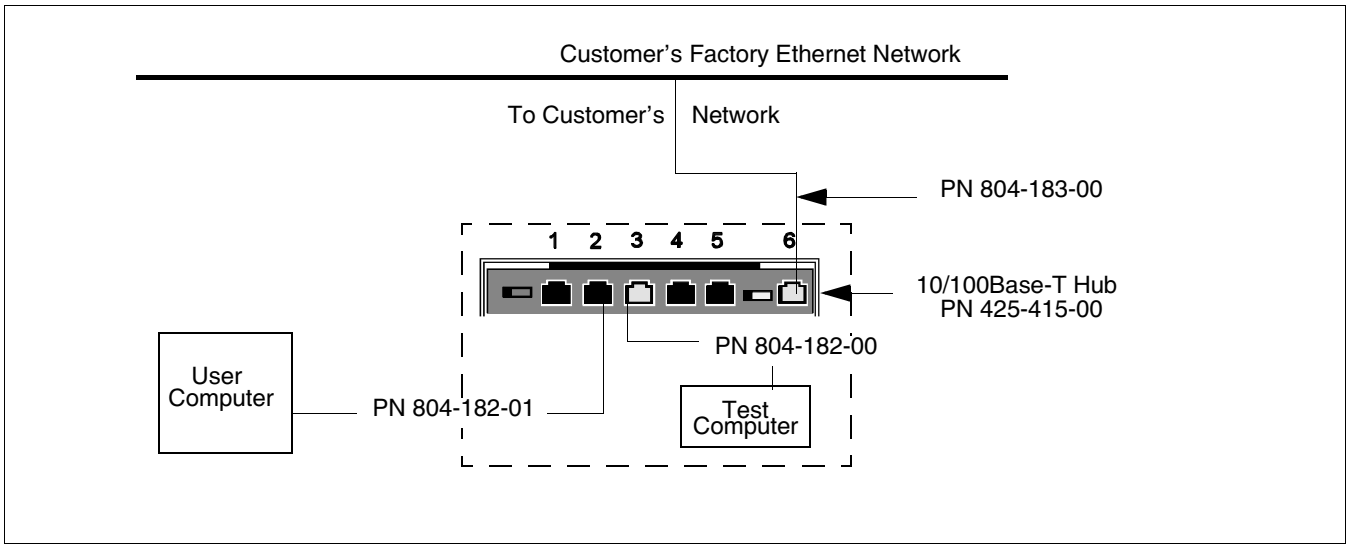
Install the 10/100Base-T Hub

1) Perform the procedure found in Preparing to Replace a Component.
2) Mount the 10/100Base-T hub to the plate as shown in 10/100Base-T Hub Mounting Assembly.
3) Attach the plate and hub to the mounting plate with four screws as shown in 10/100Base-T Hub Mounting Assembly.
4) Connect the proper end of the AC power cord to the input connector on the hub and route the other end to the main power outlet J6 in the vault at the bottom of the bay.
5) Connect cable pn 804-182-00 (RJ-45) to hub port 2 and the other end to the CPU-24/VTF Ethernet 1 port. See 10/100Base-T Hub Cabling.
6) Connect cable pn 804-182-01 (RJ-45) to hub port 3 and the other end to the User Computer Ethernet port. See 10/100Base-T Hub Cabling.



10/100Base-T Hub Mounting Assembly

7) Connect cable pn 804-183-00 (RJ-45) to hub port 6 and the other end to the outside network. See 10/100Base-T Hub Cabling.
8) If you do not need to replace any other components, go to the section Completing the Replacement.



10/100Base-T Hub Cabling

Removing the NETGEAR 10/100/1000 Ethernet Switch

Required Tools

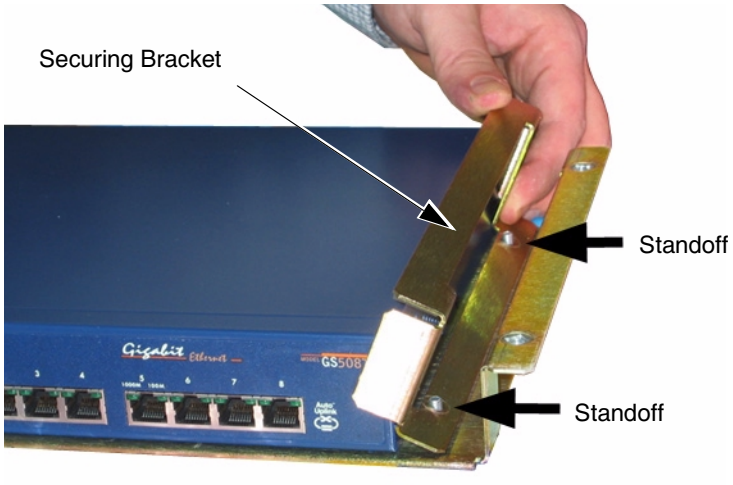
- #2 Phillips screwdriver
- 3/8 in. Nutdriver

Perform these steps to remove the NETGEAR Ethernet switch (361-928-00):

1) Perform the appropriate lockout/tagout procedures.
2) Unplug the following cables ethernet cables from the ethernet switch:
   - Cable 811-112-00 Tester Computer to Ethernet Switch Cable
   - Cable 811-113-00 User Computer to Ethernet Switch Cable
   - Cable 811-114-00 Ethernet Hub to External Network Cable
3) Unplug the AC cord from the ethernet switch.
4) Remove the four Phillips screws that secure the ethernet switch assembly to the test system.
5) Lift the ethernet switch assembly from the system cabinet and place on a static free work surface.
6) Remove the 10-32 nut that secures the ethernet switch and its securing bracket to the larger bracket. See the figure Ethernet Switch Assembly.

Ethernet Switch Assembly

7) Remove the securing bracket from the ethernet switch assembly. See the figure Securing Bracket.



Securing Bracket

8) Remove the securing bracket from the Ethernet switch.

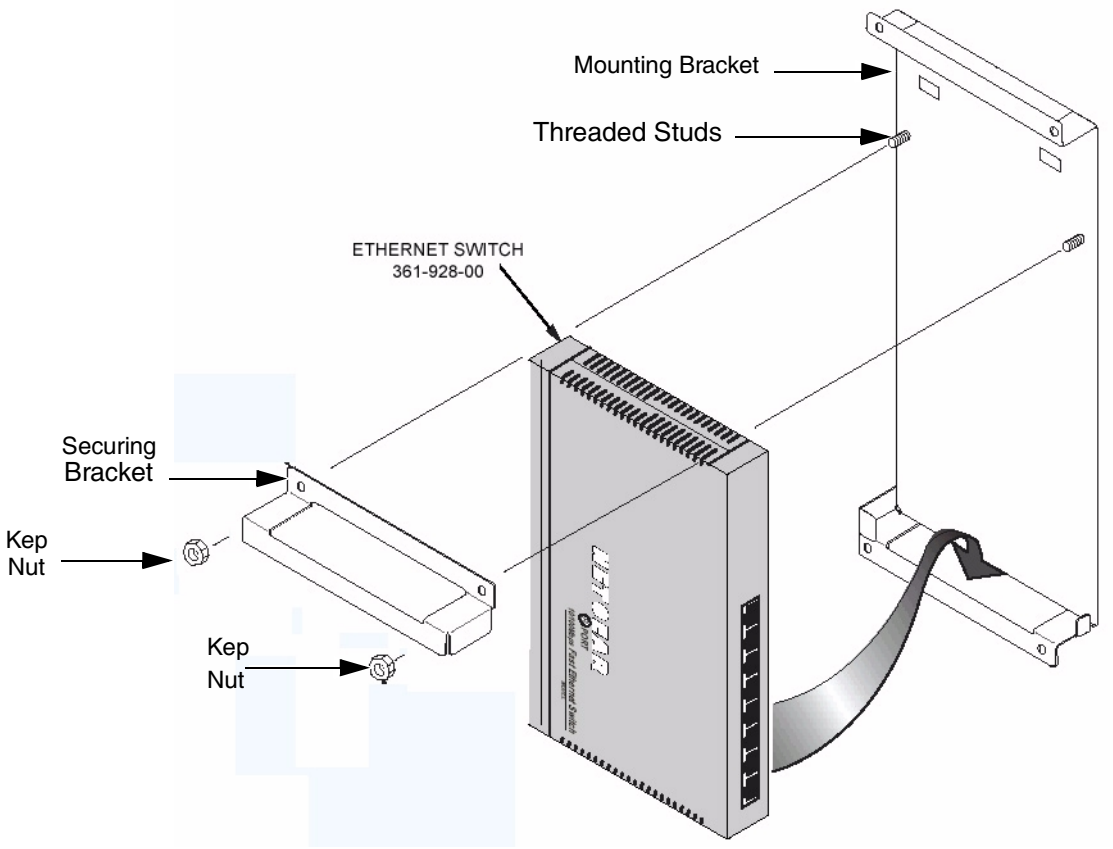
Installing the NETGEAR 10/100/1000 Ethernet Switch

This section describes how to install the NETGEAR Ethernet switch. This section is composed of the following subsections:

- Installing the NETGEAR 10/100/1000 Ethernet Switch to Mounting Hardware
- Installing the NETGEAR 10/100/1000 Ethernet Switch Assembly
- Connecting the NETGEAR 10/100/1000 Ethernet Switch Cables

Installing the NETGEAR 10/100/1000 Ethernet Switch to Mounting Hardware

1) Install the rubber feet onto the bottom side of the NETGEAR Ethernet switch as provided in the manufacturer's packaging.
2) Detach the securing bracket from the mounting bracket.
3) Mount the NETGEAR Ethernet switch (361-928-00) to the mounting bracket (474-390-00) as shown in the figure Ethernet Switch Mounting Hardware.
4) Attach the securing bracket to the mounting bracket and tighten into place with two 3/8 in. hex nuts. See the figure Ethernet Switch Mounting Hardware.
5) Torque the 3/8 in. hex nuts to 30 in-lbs.



Ethernet Switch Mounting Hardware

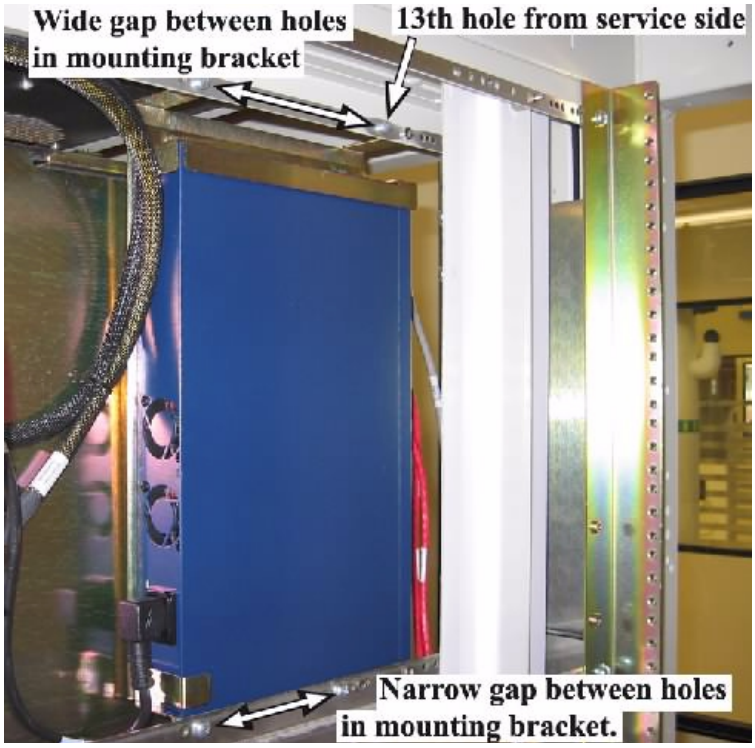
Installing the NETGEAR 10/100/1000 Ethernet Switch Assembly

1) "Orient the ethernet switch assembly so that the ethernet ports on the switch face the service side of the system and the mounting bracket's holes with the wider gap are on the top as shown in the figure Ethernet Switch Assembly Orientation.

2) Secure the Ethernet switch assembly to the side rail of the mainframe using four #10-32 screws (470-296-01). Attach the screws to the bracket from the system side as shown in the figure Ethernet Switch Assembly Orientation. Torque the screws to 30 in-lbs.

Note

Align the 13th hole on the system chassis from the service side with the upper right threaded hole on the mounting bracket.



Ethernet Switch Assembly Orientation

1) Connect the power cord left from the previous Ethernet switch to the power plug on the Ethernet switch and route it to the operator side.
2) Connect the user computer Ethernet cable (811-113-00) to port 1 on the Ethernet switch.
3) Connect the test computer Ethernet cable (811-112-00) to port 3 on the Ethernet switch.
4) Connect the external network cable (811-114-00) to port 8 on the Ethernet switch and route it to the strain relief bracket at the lower end of the system cabinet, and then to the customer facility Ethernet port.

Completing the Replacement

1) Replace the card cage cover or the user power panel (if necessary).
2) Replace the test system covers.
3) Turn on main and test system power.
4) Restart system, following procedure found in Restarting the System in Software Commands and Tests.
5) Run checkers. See Run Checkers and VTS in Software Commands and Tests.

Overview

The Catalyst Test system's computers run on Sun Microsystems Solaris 2.5.1. This chapter describes Solaris software commands and verification procedures useful for troubleshooting. This chapter contains the following sections.

- Sun Operating System
- Restarting the System
- Diagnostic Tools
- The Test Computer Boot Sequence

Sun Operating System

The default Catalyst system comes configured with two 2.1 Gbyte hard drives (SS5, Ultra 1), a system may have a 4.3 Gbyte drive (SS5, Ultra 1 and Ultra 5 production) or one 9.1 Gbyte drive (Ultra 5 engineering) instead. The first drive is loaded with Sun base level OS (operating system), SunVTS and IMAGE. The second drive is partitioned, formatted and mounted, but is not currently used by Teradyne and is available for future expansion and data storage.

The A5 family runs Solaris 1 (SunOS 4.1.x) or Solaris 2 (SunOS 5.4, 5.5.1). The Catalyst and Catalyst LC systems run Solaris 2 (SunOS 5.5.1) or Solaris 8 (SunOS 5.8)..

Common Commands

Solaris 2 has many commands that are new or different from Solaris 1. The directory `/usr/ucb` contains many commands from Solaris 1 that have been ported over for compatibility reasons. The tables Common Floppy Tar Commands through Common Commands contain some of the more common commands that are used in day to day use of the test systems. The table Solaris Files provides the names of important files in either Solaris 1 or 2.

Common Floppy Tar Commands

Operation	Solaris 1	Solaris 2	Solaris 8
View Files	% tar tvf /dev/fd0	% volcheck % tar tvf /vol/dev/aliases/floppy0	N/A
Extract files	% tar xvf /dev/fd0	% volcheck % tar xvf /vol/dev/aliases/floppy0	N/A
Store files	% tar cvf /dev/fd0 [filename]	% volcheck % tar cvf /vol/dev/aliases/floppy0 [filename]	N/A

Common Tape Tar Commands

Operation	Solaris 1	Solaris 2	Solaris 8
View Files	% tar tvf /dev/rst8	% tar tv4 or % tar tvf /dev/rst4	N/A
Extract files	% tar xvf /dev/rst8	% tar xv4 or % tar xvf /dev/rst4	N/A
Store files	% tar cvf /dev/rst8 [filename]	% tar cv4 % tar cvf /dev/rst4[filename]	N/A

Common Commands

Operation	Solaris 1	Solaris 2	Solaris 8
View system processes	% ps -aux	% ps -face	% ps -face
Print a file	% lpr -P [printer name] file name	% lp -d [printer name] file name	% lp -d [printer name] file name
Display disk information	% df	% df -k	% df -k

Solaris Files

File	Solaris 1	Solaris 2	Solaris 8
File systems to mount	/etc/fstab	/etc/vfstab	/etc/vfstab
File systems to export	/etc/exports	/etc/dfs/dfstab	/etc/dfs/dfstab
System password file	/etc/passwd	/etc/passwd and /etc/shadow	/etc/passwd and /etc/shadow
Mail directory	/var/spool/mail	/var/mail	/var/mail

Restarting the System

The test computer boot sequence is very useful when troubleshooting the test computer subsystem. Various commands at the different stages of rebooting the system can be used to locate specific problems with the test computer subsystem. See The Test Computer Boot Sequence for an explanation of each phase of the test computer boot. The figure Computer Subsystem Flow Diagram, a block diagram of the test computer subsystem flow, is also helpful.

If any changes have been made, reboot the system from the user computer.

1) Turn on the system power and the test system power.
2) At the `ok` prompt, type `reset`
3) Run checkers and Sun VTS. See the section Run Checkers and VTS.

Boot the User Computer

There are three boot commands that you can use to start the user computer from the `ok` prompt.

- `boot -v` This boots Solaris 2 in verbose mode. Verbose mode displays all boot information.
- `boot -r` This boots Solaris 2 with “reconfigure” option/flag. The reconfigure flag needs to be set each time the system’s hardware configuration has changed.
- `boot -s` This boots Solaris 1 or 2 in Single User mode. This is useful for troubleshooting. To do this you need the root password.

Verify the Booting Location

On a system that fails to boot properly, verify that the user computer is attempting to boot from the correct location.

1) Type `halt` or hold the L1 (Stop) key down and press the letter `a` (or `A`).
2) At the `ok` prompt, type `printenv`
3) Look for the variable `boot-device`. This variable is normally set to `disk` for the user computer.
4) If this variable is not set correctly, at the `ok` prompt type `setenv boot-device disk`

   The computer responds with `boot-device = disk`.
5) Verify that the changes have taken place by typing `printenv`

Verify SCSI Devices

If it becomes necessary to view which SCSI devices are or are not being recognized by the computer, use the `probe-scsi` command. Executing `probe-scsi` polls the computer for all SCSI devices, whether internal or external and display their SCSI target ID. The `probe-scsi` command typically lists the SCSI target address, unit number, device type, manufacturer and model number as well as memory capacity if the device is a hard drive.

It should be noted that SCSI target ID's are often determined by the switch setting located directly on the device which is common among external devices. For internal devices they may be numbered according to a jumper setting or the devices physical location in the machine; i.e. 2 internal hard drives located directly on top of one another. There are SCSI targeting conventions that should be followed whenever adding additional devices.

Note

Probe-scsi will not identify the Ultra 5's primary disk drive (IDE).

Use the following probe-scsi command to view and verify the internal SCSI devices:

1) At the `ok` prompt, type: `probe-scsi` (SS5 and Ultra 1 systems)

   or `probe-scsi-all` (systems with a host adapter card (Ultra5)).

Typical output for an SS5 with the following configuration is shown below:

- Internal 1 Gbyte drive
- Internal 0.5 Gbyte drive
- Internal CD-ROM
- External 150 Mbyte tape drive

The screen shows the following information:

```
Target 1
Unit 0  Disk      QUANTUM FB1080J SUN1.05630D9547619380
                  SUN MICROSYSTEMS
Target 3
Unit 0  Disk      SEAGATE ST5660N  SUN05350644EA256793
                  Copyright (c) 1993 Seagate
                  All rights reserved 0000
Target 4
Unit 0  Removable Tape
                  ARCHIVE VIPER 150 21247-07: 01
                  CREATED012695
```

```
Target 6

Unit 0  Removable Read Only Device
                  SONY CD-ROM CDU-8012 3.1e

ok
```

Typical output for an SS5 with the following configuration is shown below:

- Internal 2.1 Gbyte drive
- Internal CD-ROM

```
Target 1

Unit 0   Disk    SEAGATE ST32430W  SUN2.1GB066600720485
                 Copyright (c) 1995 Seagate
                 All rights reserved

Target 6

Unit 0   Removable Read Only Device
                 TOSHIBA XM-4101TASUNSLCD175506/24/95

ok
```

Activate the Second Monitor

When software is loaded onto an Engineering Model Catalyst, it will not automatically recognize that the system contains two monitors. Consequently, the system only turns on one monitor. To activate the second monitor, follow the instructions below:

1) Type `/usr/teradyne/sst/bin/fb_setup`
2) Follow the script prompts.

Boot the Test Computer

The test computer is booted from the user computer. The test computer is accessed from the user computer using the tip hardwire function. If an ELMA card cage board has been replaced, use the procedure found in Reboot After Installing an ELMA Card Cage Board.

Connect to the Test Computer Using Tip Hardwire

Before using Tip Hardwire, note the following:

- If you use the tip command in a cmdtool window to boot the test computer, you may hang the window due to a SunOS bug. Either turn off scrolling in the cmdtool window or use a shelltool window.
- The serial B to A cable (pn 804-189-00) must be installed between the user computer and the test computer in order to use tip hardwire.

For more information about Tip Hardwire, refer to Serial (Tip Hardwire) Connection in Networking Description .

1) Turn the system power and the test system power on.
2) Log in to user computer as `root`.
3) In response to the `hostname_s#` prompt, type `tip hardwire`
4) When system displays `connected`, press the Return key.

The response varies depending on the state of the test computer. The three possible states are:

- Test computer is halted and at the PROM monitor. In this case, the response when you press the Return key is the PROM monitor prompt (> or `ok`).
- Test computer is in the process of booting. During this time volumes of text about the boot process appear.
- Test computer is up and running. The `login` prompt appears at this stage.

The table Key Tip Command Sequences lists the two key command sequences typically used when accessing the test computer.

Key Tip Command Sequences

Sequence	Function
~ # (tilde pound-sign)	Send break
~ . (tilde period)	Exit from tip

Note

Send break is the same as crashing the system. It is the equivalent of pressing L1 -A

Verify Boot Location

On a system that fails to boot properly, verify that the system is attempting to boot from the correct location.

1) Use the tip hardwire procedure to access the test computer. See Connect to the Test Computer Using Tip Hardwire.
2) Type ~ # (send break).
3) At the `ok` prompt, type `printenv`
4) Look for the variable `boot-device`. This variable is normally set to `net` for the test computer, or `net2` (for the Force CPU-24/VTF computer with the new 10/100Base-T hub).
5) If this variable is not set correctly, at the `ok` prompt type:

   ```
   setenv boot-device net
   ```

   or

   ```
   setenv boot-device net2
   ```

   The computer should respond with `boot-device = net`.
6) Verify that the changes have taken place by typing `printenv`

Identify Test Computer

When power is applied to the test computer, it has no identity of its own. At this stage, all it can do is broadcast its Ethernet address which is unique to that unit and stored in the non-volatile RAM (NVRAM).

After a successful boot up, the user computer receives the test computer's Ethernet broadcast and evaluates it by looking in its `/etc/ethers` file and seeing if it recognizes the broadcast address. The following is an example of an `/etc/ethers` entry:

```
0:8.ad:20:b:ae                bay2t
```

The user computer then cross references the test computer's hostname, in this case `bay2t` to its `/etc/hosts` file. The following is an example of the host's file entry:

```
131.101.28.19                 bay2t
```

At this point the user computer can tell the test computer that it heard the Ethernet broadcast request and that the test computer's IP address is `131.101.28.19`. The process is called RARP (reverse address resolution protocol request).

Find Test Computer Files

Once the test computer knows its identity, it must also find its root and swap space directories. To do this the test computer turns to the `/etc/bootparams` file on the user computer.

Monitor Network Traffic

The snoop command monitors any traffic going across the network. To use the snoop command, execute the following steps. To review more information on snoop, execute `man snoop` on a Sun workstation.

1) Physically unplug the system from its external network.
2) Boot the system.

   If ARP/RARP errors are present during the test computer boot-up, wait several minutes until the RARP request times out. You will be able to log in after the time-out.
3) Log in to the test computer as `root`
4) Type `/usr/openwin/bin/openwin`
5) Open a command tool window.
6) In the command tool window, type `tip hardwire`
7) After the `connected` message, press Return and log in as `root`. If the test computer does not proceed to the `login` prompt, type `~ #`

   This halts the test computer.
8) Open another command tool window.
9) In the new command tool, log in as `root`
10) Type `snoop` and press Return
11) At the `ok` prompt in the first command window (where the test computer was halted) type `reset`

    After a few seconds you should see the test computer broadcast its MAC address to the user computer and the user computer respond with its hostname. The test computer should then supply the necessary boot information.

Note

The data scrolls very fast. If you want to verify any information, press Control-C to halt the screen.

Reboot After Installing an ELMA Card Cage Board

If changes have been made to the ELMA card cage, perform the following boot procedure:

1) Turn on the system power and the test system power.
2) Log in at the user computer as `root`.
3) Enter password.

4) Type `tip hardwire`

   The computer displays the following:

   ```
   Connected

   Timeout waiting for ARP/RARP packet
   ```

5) Type ~ # (tilde and shift 3).

Edit Etc/Ethers

1) At the ok prompt, type `banner` and press Return.

   The computer displays the following:

   ```
   SPARC CPU-24VTFMP (4 x RD626), NO KEYBOARD
   ROM Rev 2.25.2, 128 MB memory installed, Serial #
   9131299
   Ethernet address: xx:xx:xx:xx:xx:xx, Host ID: 728B5523
   ```

   `xx:xx:xx:xx:xx:xx` shows the format and location of the IP address for the new test computer board.

2) Record the IP address displayed on the screen.

3) Enter ~ . (shift tilde and the ".").

   This brings you back to the # user computer prompt.

4) Use vi or another known editor to edit the `/etc/ethers` file.

   Once this file is open in the editor, you should see a single line displayed with the old IP address. Enter the new IP address that you recorded in Step 2. Save your changes and close the file.

5) At the prompt type `cd /var/yp;/usr/ccs/bin/make ethers` and press Return.

   This command tells the system a change was made and to use the new data and update the NIS information.

   The computer displays the following:

   ```
   updated ethers
   pushed ethers
   ```

   If any errors appear, you don't understand any of the procedures, or the network has been customized, stop and ask the system administrator for help.

Confirm Devices

1) At the # prompt, type `tip hardwire` and press Return.

   The computer displays:

   ```
   connected
   ```

2) Type `printend` and confirm the following information:

`input devices`	`ttya`
`output devices`	`ttya`
`self-test #megs`	the correct amount of memory
`boot device`	`net` (old 10Base-T hub) `net2` (CPU-24/VTF with 10/100Base-T hub)

3) At the `ok` prompt, type `boot net` and press Return.

   Watch the booting process to check for errors.

4) Type `~ .` (shift tilde and the ".").

5) At the # prompt type `exit` and press Return.

Run Checkers and VTS

Refer the section Checkers for an explanation of the various computer subsystem checkers. For more information about Sun VTS, see SunVTS.

1) Run the `databus_st` and other appropriate checkers.

2) Run `Sun VTS`. (VTS can be run in a graphical mode under OpenWindows or IMAGE or in text based mode)

   To launch VTS in graphical mode, type `/opt/SUNWvts/bin/sunvts`

   To launch VTS in text mode, type `/opt/SUNWvts/bin/sunvts -t`

Reconfigure the Solaris 2 System

Anytime the system configuration (internal and external components) is changed you need to reconfigure Solaris 2. A system change does not include swapping one part with an identical part.

1) Halt the system (if not already halted).

2) Make hardware changes (if not already done).

3) Start system up, but before `OS` begins press L1-A (press the L1 or STOP key in the top left of the keyboard and the A key simultaneously).

4) Type `boot -r`

This tells Solaris that a hardware change has occurred and causes the system to automatically reconfigure. This updates the kernel drivers, device links, etc.

Rename Path_to_Inst File

If upgrading the test computer (from an ELMA to Ultra Series or from an Ultra 10 to Ultra 60), reconfigure Solaris using the following procedure:

1) Halt the system (if not already halted).

2) Make hardware changes (if not already done).

3) Start system up and boot the user computer and test computers.
4) Type `tip hardwire`
5) Type `boot -ar`
6) The computer will ask you several questions, choose the default in every case.
7) The computer will ask you if you want to rebuild the `path_to_inst` file. Answer `Y`

Verifying the Serial Ports

The Catalyst or Catalyst LC test system uses either a RS232 Serial Expansion Interface (Ultra 10 or 60 test computer), which has three serial ports or connects directly to the CPU-24VTF front panel, which has four serial ports.

Verify the CPU-24/VTF Serial Ports

The following procedure is used to test the serial ports on the CPU-24VTF.

1) Install Loopback Connector (pn 425-391-00) on J7, J8, J9, or J10 on front control panel depending on the port being tested (b, c, d, or e respectively).
2) Type `rlogin` (you do not need to log in as `root`) to the tester computer (CPU-24VTF).
3) Type `cd /opt/bin` or `/opt/SUNWvts/bin` (depending on the location of the Sun VTS package).
4) Enter the following command to test port b:

```
sptest -v -f -o
dev=zs0,porta=b,T=a,L=Plug,M=async,B=9600
```

Repeat the above steps for all handler/prober ports (c-e), changing the `porta=x` variable in the test command line so that x is the port to be tested (e.g., `porta=c`, `porta=d`, etc.).

The following is an example of a successful test

```
checkers@bay26t 19% sptest-v-f-o
dev=zs0,porta=b,T=a,L=Plug,M=async,B=9600
dev=zs0,porta=b,T=a,L=Plug,M=async,B=9600
sptest: Started.
Writing 3000 bytes to asynchronous port /dev/term/b at
9600 baud.
Device '/dev/term/b' tested OK.
sptest: Stopped successfully.
checkers@bay26t 20%
```

The following are two examples of failed tests:

```
checkers@bay26t 21% sptest -v -f -o
dev=zs0,porta=b,T=a,L=Plug,M=async,B=9600
sptest -v -f -o
dev=zs0,porta=b,T=a,L=Plug,M=async,B=9600
dev=zs0,porta=b,T=a,L=Plug,M=async,B=9600
```

```
sptest: Started.
Writing 3000 bytes to asynchronous port /dev/term/b at
9600 baud.
SUNWvts.sptest.2006 04/30/97 14:26:43 sptest zs0
INFO: “Time out error!” Probable_Cause(s):
<No loopback plug> Recommended_Actions: <Check
Loopback plug!>
SUNWvts.sptest.8008 04/30/97 14:26:43 sptest zs0
FATAL: Device '/dev/term/b' does not respond.  No data
detected.
checkers@bay26t 22%
```

or

```
checkers@bay26t 70% sptest -v -f -o
dev=zs0,porta=b,T=a,L=Plug,M=async,B=9600
dev=zs0,porta=b,T=a,L=Plug,M=async,B=9600
sptest: Started.
Writing 3000 bytes to asynchronous port /dev/term/b at
9600 baud.
SUNWvts.sptest.6002 04/30/97 15:24:10 sptest zs0
ERROR: “data error on device '/dev/term/b', exp =
0x6c, obs = 0xa.”
checkers@bay26t 71%
```

Verify the RS232 Serial Expansion Ports

The following procedure tests the RS232 serial ports (Ultra 10 or 60).

There are three ports to be tested:

- Port 0 (tested at J8 on the bulkhead)
- Port 1 (tested at J9)
- Port 2 (tested at J10)

1) Boot the user and test computers.
2) Type `tip hardwire`
3) Log in as `root`
4) Type `csh`
5) Type `setenv IMAGEBIN /image/bin.rls`
6) Type `setenv LD_LIBRARY_PATH $IMAGEBIN/lib`
7) Type `cd /image/bin.rls/diag/rs232`
8) Connect the RS232 loopback plug (pn 425-391-00) to J8 on the bulkhead.

9) Type `./terloop -i 0`

   The following output should appear:

```
Testing transfer size 1...

Testing transfer size 2...

Testing transfer size 4...

Testing transfer size 8...

Testing transfer size 16...

Testing transfer size 32...

Testing transfer size 64...

Testing transfer size 128...

Testing transfer size 256...

Testing transfer size 512...

Testing transfer size 1024...

Test Completed Successfully
```

10) Move the RS232 loopback plug to J9 (bulkhead).

11) Type `./terloop -i 1`

    The same output as shown in step 9 should appear.

12) Move the RS232 loopback plug to J10 (bulkhead).

13) Type `./terloop -i 2`

    The same output as shown in step 9 should appear.

14) Remove and safely store the RS232 loopback plug.

15) Log out of the test computer.

Determine the Number of Processors on a CPU-24/VTF

1) Log in to the test computer (either as `rlogin` or `tip hardwire`)

2) At the command prompt type `/usr/sbin/psrinfo -v`

   A status report is returned for each processor installed. The report of a two processor board looks similar to this report:

```
checkers@bay26t 2% /usr/sbin/psrinfo -v
Status of processor 0 as of: 05/08/97 14:33:59
Processor has been on-line since 05/08/97 12:12:41
The sparc processor operates at 150 mHz, and has a
sparc floating point processor
```

```
Status of processor 2 as of: 05/08/97 14:33:59
Processor has been on-line since 05/08/97 12:12:45
The sparc processor operates at 150 mHz, and has a
sparc floating point processor
checkers@bay26t 3%
```

Diagnostic Tools

SunVTS

Refer to Sun documentation for details on running SunVTS. SunVTS is the Sun Verification Suite. SunVTS, or VTS, is provided as the diagnostic package for both the user and test computers. VTS should be installed in the file `/opt/SUNWvts`. If VTS is not installed, it is provided on the IMAGE installation CD. Refer to the Catalyst Software Installation Guide (pn 553-403-76) for more information on how to install SunVTS.

VTS can be run in a graphical mode under OpenWindows or IMAGE or in text based mode. VTS also has individual programs that can be run from the command prompt. For example, Teradyne uses sptest. (See Verifying the Serial Ports.)

Checkers

The only checker that specifically tests components of the computer subsystem is `databus_st`. This checker has two parts. The first checks low level functionality of the BIF (949-634) and the second checks the low level functionality of the TBA (879-700). This checker does not check the computer or the system's databuses.

The following checkers are also useful.

- `pmm_st`, which tests the GPIB connection, is used if the system has a precision multimeter. If the system does not contain a PMM, run `dcref_cal` instead.
- `vhf_st`, which specifically checks the TCIO bus and Terabus functionality.
- `plfal_st`, which runs specific tests to verify that the installed system utilizes the TCIO busses.

databus_st Failure

If there is a checker failure, follow these instructions:

1) Reseat any suspect board and rerun the job. If the checker still fails, datalog the failing tests.
2) Replace the suspect board with a known good board and run the checkers. If the checker passes, remove the known good board and plug in the suspect board to verify and hardcopy or datalog the problem.

- If the suspect board passes, hardcopy-datalog the pass, and return the suspect board with both the passing and failing datalogs to the factory. Insert and retain the known good board for continued operation.
- If the board does not pass, return the board with failing datalogs to the factory. Refer to Global Customer Service (GCS) Centers to order replacement parts.

POST

The POST (Power-On-Self-Test) memory test is run automatically during system boot up on both the user and test computers. However, the amount of RAM tested during POST must be specified before the self test can recognize it.

Determine Memory Tested

To determine the amount of memory tested during POST:

1) At the `ok` prompt type `printenv`

   This displays the current system environment settings on the monitor.

2) Check the variable `selftest-#megs`.

   This variable should be set to the amount of memory that is installed in the system. Sometimes this number is set to 0 or 1 to speed up the boot process. Setting `selftest -#megs` to 0 or 1 skips the memory test.

Set selftest-#megs

Locate the amount of memory listed in the second line of the banner, see Edit Etc/Ethers for an example and Banner for an explanation of the banner message. If the amount of memory tested needs to be changed, use the following procedure:

At the `ok` prompt type `setenv selftest-#megs X`

(X is the amount of memory (i.e., 32, 64, 128, etc.) installed in the system.)

The computer should respond with the following:

`selftest-#megs = 32` (whatever amount to which you set the variable)

This example tells the computer to perform a diagnostic test on 32 megabytes of memory prior to booting.

Verify POST

1) At the `ok` prompt type `printenv`

2) Once `setenv` has been set correctly, type `reset` at the `ok` prompt to run the memory selftest.

   This resets the computer, which executes a memory test followed by system boot-up.

The Test Computer Boot Sequence

The test computer is configured as a diskless client. As most computers require some disk space for data storage, it must rely on some other host for it's disk space. The test computer relies on the user computer for this purpose.

During the boot-up sequence of the test computer it must obtain the operating system (Solaris 2) from the user computer. This enables the test computer boot. It accesses all the necessary files over the Ethernet connection between the test and user computer. The following information details the beginning of the boot sequence. This is useful for troubleshooting, because this is where most test computer boot problems occur.

Firmware Phase

At this stage the computer relies on the NVRAM, bootprom and the associated firmware to start the system in the beginning stages of operation.

- Reset, see Restarting the System
- POST
- Banner
- Memory Tests
- Boot PROM loads boot block (from server), see Boot Block

POST

POST is initiated after power cycle or upon a reset or boot command. During this phase, POST checks a great deal on the systems hardware such as the motherboard and memory. During POST, nothing is displayed to the Monitor, however it is possible to interpret the LED patterns which appear on the keyboard to assist in diagnosing POST failures. Alternatively, POST failures can be viewed by connecting a "dumb" terminal to the bad computer via a null modem cable.

Banner

After POST has completed successfully, the system will display a banner message to the screen. the banner message includes such important information as the machine's ethernet (MAC) address, host id, firmware revision level, amount of RAM and CPU type.

The following is an example of the banner message:

```
SPARC CPU-24VTFMP (4 x RD626), NO KEYBOARD
ROM Rev 2.25.2, 128 MB memory installed, Serial # 9131299
Ethernet address: 131.101.28.19, Host ID: 728B5523
```

Memory Tests

After the banner message is displayed, the computer will then “Initialize Memory”. Typically a spinning icon will be displayed to the screen during this phase. At this phase the test computer’s on-board RAM is being tested.

Boot Block

At this point the computer downloads its boot block. Normally a computer accesses the first few sectors on its disk to acquire the boot block. However, because the test computer is a diskless client, it relies on another device or host to get it.

In the standard configuration, the user computer serves this purpose. During this time, the test computer broadcasts its ethernet address. The user computer, configured as an OS server, sees the request and look in its `/etc/ethers` file to see if the client broadcasting is listed as the one it is supposed to service. After finding its ethernet (MAC) address and corresponding hostname in the `/etc/ethers` file, the user computer then cross-references the host name to its IP address by looking in the `/etc/hosts` file.

Once this is located, the user computer replies to the test computer (client) and informs the computer of its identity. It also looks in the `/tftpboot` directory and tell the test computer where to get its boot block information. Two links are in `/tftpboot` file, these links have the test computer’s MAC IP address (in hexidecimal notation) pointing to the boot block for that particular client’s hardware architecture (for example, `828D0E09.SUN4 -> boot.sun4`). The system then uses the tftp (trivial file transfer protocol) to download the boot block into the test computer’s boot PROM.

Finally, the boot block loads directly onto the test computer and proceeds to the next phase of the boot sequence.

Non-Volatile RAM Phase

The non-volatile RAM (NVRAM) phase, also called the “Boot PROM phase,” provides system information and prepares to load the `bootstrp` program. First, NVRAM loads the NVRAM environment setting. The NVRAM environment setting is part of the default boot device that is programmed into the PROM. This allows the computer to run the `bootblk` program from its PROM. `Bootblk` runs the UFS file-system reader, which opens the boot device.

Kernel and Hardware Phase

The kernel and hardware phase loads the fundamental part of the operating system. The Boot Block loads the bootsrap program, which is a small piece of low-level code stored in ROM. The `bootstrp` program is a subset of the boot program; its sole function is to locate, load, and boot the kernel. The kernel then loads several hardware and software drivers, including the following system components:

- UFS file system
- Network Interfaces (Refer to the section hme vs. le in the chapter Networking Description for more information.)
- Remote Procedure Call (RPCbind) (Refer to the section Network File System in the chapter Networking Description for more information.)
- NIS (Refer to the section Network Information Service in the chapter Networking Description for more information.)
- NFS (Refer to the section Network File System in the chapter Networking Description for more information.)

Boot Program Phase

The boot device finds and loads the secondary boot program into memory. The secondary boot program is called `/platform.'uname-i'/ufsboot`. After loading `/platform.'uname-i'/ufsboot`, The boot PROM loads both the generic kernel (`/kernel/genunix`) and the platform specific kernel (`/platform/'arch -k /kernel/unix`).

Kernal Initialization Phase

As soon as the kernel initializes, it loads modules using the `/platform /'arch -k /kernel/unix` program to read the file. When the kernel has read the modules needed to mount the root partition, it unmaps the /platform/'uname -i'/ufsboot program from memory and continues initializing the system using kernel resources.

The `/sbin/init` Phase

The first resource that kernel uses is the `/sbin/init` program. To run this, it starts a user process that loads `/sbin/init`. The `/sbin/init` program first accesses the `/etc/inittab` file which it uses to execute procedures that do the following:

- Bring the system up to the default run level
- Control transistions between run states and `rc` scripts by re-reading `/etc /inittab`

See the table RC Scripts Sequences for a complete description of `rc` script processes.

Software Phase

The software phase of the test computer boot prepares the test computer to receive files and software from the user computer and starts the NFS server process. The `Init` program starts running the `rc` scripts, which are located in subdirectories of the /etc directory. The rc scripts start system processes as shown in the table RC Scripts Sequences. When the `rc` scripts have run, the `init` then processes the system login requests.

RC Scripts Sequences

Run Level	RC Script	RC Directory	Common Functions
0	`/sbin/rc0`	`/etc/rc0.d`	Stops all running processes except `init` and unmounts all file systems.
1	`/sbin/rc1`	`/etc/rc1.d`	Stops all non-essential system daemons.
2	`/sbin/rc2`	`/etc/rc2.d`	Stops the NFS, volume management, and `lp` services. Mounts the file systems. On startup, starts most of the system services except the NFS server.
3	`/sbin/rc3`	`/etc/rc3.d`	Starts the NFS server process.
S	`/sbin/rcS`	`/etc/rcS.d`	Starts the basic network services and mounts the `/usr` directory. Executes the reconfiguration commands that are required for reconfiguring the system.

Broadcast MAC Address Phase

Because the test computer has no disk of its own, and therefore no hostname or identity of its own, it needs to get that information in order to acquire one. However, when the boot or reset command is entered into the test computer, the only thing it can do is broadcast its Ethernet (MAC) address. This is then hard coded into the NVRAM. The test computer broadcasts its MAC address, a host somewhere on its network recognizes it and responds to its request. This request can be seen by using the snoop command. See Monitor Network Traffic for the `snoop` command procedure.

RARP Phase

Once the test computer broadcasts its MAC address, the user computer, which is set up as an NIS server searches its `/etc/ethers` file to see if recognizes the MAC address being broadcast. If the MAC address of the test computer matches the one in the `/etc/ethers` file, the user computer responds to the test computer. The following output appears:

```
MAC address 0:8:42:a0:45, you are hostnamet
```

Overview

To order a replacement part, call or fax the nearest Teradyne Global Customer Services (GCS) center. Each center covers a specific region. To locate the nearest Teradyne GCS center in your region, refer to the following pages.

Note

If your order requires immediate attention, please call by telephone. See Teradyne Global Customer Service Centers.

Procedure for Parts Handling and Return

Note

To prevent shipping and electrostatic discharge (ESD) damage, follow the parts handling procedure in this section.

All parts shipped from Teradyne's GCS centers are packaged in materials that protect them during transit. Part of this protection includes antistatic packaging. Teradyne recommends that you use the following antistatic precautions when you handle any parts:

1) Store the part in its antistatic packaging (for example, antistatic bag and shipping container) until it is required for use. Save the original packing materials used to ship the part from Teradyne.
2) Ensure that personnel are adequately protected from static charge by requiring use of an antistatic ground strap when handling the part.
3) When returning defective parts to a Teradyne Global Customer Services center, place the part in the original antistatic bag and shipping container. This will help ensure that parts are not damaged by electrostatic discharge or physically damaged when being returned to Teradyne. For additional information about static-protection precautions, see the Safety section of your test system service manual.

Procedure for Ordering Replacement Parts

To order a replacement part, call or fax* the nearest Teradyne Global Customer Services center. Refer to Teradyne Global Customer Service Centers to locate the nearest Teradyne GCS center in your region. Have the following information ready when you call or fax for a replacement part:

- ❒ Customer name and Teradyne customer number
- ❒ Complete “Ship To” address and “Bill To” address (if the transaction is billable)
- ❒ Customer contact and telephone number
- ❒ Purchase order or service agreement number - (For Teradyne GFS, have the GFS on-site report number, or sales order number for new installations.)
- ❒ System serial number and system type
- ❒ Teradyne part number and type of service desired
- ❒ Quantity required

* If order is for Emergency Service, please call. (Do not fax rush orders.)

Field Replaceable Units

Note

Availability of all the following listed parts is subject to the supply at each local Teradyne Global Customer Service center.

User Computer Parts

When ordering replacement parts, refer to the following tables for the appropriate part number:

The following kits are available for replacement SS5 computers:

- 425-464-00 - Refurbished SS5, 2.1 Gbyte
- 425-465-00 - Refurbished SS5, 4.2 Gbyte

SS5 User Computer Group Replacement Parts

Teradyne Part No.	Description
Internal Components	
425-321-05	32Mbyte DIMM memory module
425-459-00	4.2 Gbyte internal disk drive
425-407-00	10/100 SBus Ethernet Adaptor
425-374-01	Internal 4X CD-ROM drive
425-375-01	2.1 Gbyte internal hard drive

Teradyne Part No.	Description
425-377-00	1.44 Mbyte floppy drive
425-378-00	150W INT SS5 power supply
425-379-03	SS5 170MHZ CPU board
425-383-00	1Mbyte TurboGX graphics accelerator
External Components	
425-437-00	Type 5 mouse (compact)
425-461-00	Type 6 mouse
425-417-01	Premium color monitor with captive 13W3 video cable
425-328-04	4Gbyte external disk drive
425-341-01	2.5Gbyte 1/4 inch external tape drive
425-407-00	10/100Base-T Sbus Ethernet adaptor
425-438-00	Type 5 keyboard w/ cable
425-370-00	SSLX type 5 keyboard
425-460-00	Type 6 keyboard
425-371-00	Type 5 mouse and pad
Cables	
901-094-00	208V power cord

Ultra1/140 User Computer Group Replacement Parts

Teradyne Part No.	Description
Internal Components	
425-407-00	10/100BASE-T Sbus Ethernet adaptor
425-383-00	1Mbyte TurboGX graphics accelerator
425-384-00	Ultra 1/140 CPU board
425-385-00	Ultra replacement power supply 180W
425-386-00	Ultra memory module 32Mbyte SIMM (two required)
425-403-00	Ultra 1/140 2.1Gbyte internal hard drive
425-404-00	Ultra internal 4X CD-ROM drive
425-408-00	Ultra 1.44Mbyte floppy drive
External Components	
425-417-00	Sun monitor 20 inch color
425-341-01	2.5Gbyte 1/4 inch external tape drive
425-328-04	4Gbyte external disk drive
425-370-00	Type 5 keyboard

425-371-00	Type 5 mouse and pad
425-407-00	10/100BASE-T Sbus Ethernet adaptor
Cables	
901-094-00	208V power cord

Ultra1/170E User Computer Group Replacement Parts

Teradyne Part No.	Description
Internal Components	
425-407-00	10/100BASE-T Sbus Ethernet adaptor
425-408-00	Ultra 1.44Mbyte floppy drive
425-412-00	Ultra 1/170E CPU board
425-413-00	Ultra 1/170E Creator graphics board
425-414-00	Ultra 1/1/70E 2.1 Gbyte internal disk
425-383-00	1Mbyte TurboGX graphics accelerator
425-385-00	Ultra replacement power supply 180W
425-386-00	Ultra memory module 32Mbyte SIMM (two required)
External Components	
425-371-00	Type 5 mouse and pad
425-370-00	Type 5 keyboard
425-417-00	Sun monitor 20 inch color
425-328-04	4Gbyte external disk drive
425-341-01	2.5Gbyte 1/4 inch external tape drive
425-404-00	Ultra internal 4X CD-ROM drive
425-407-00	10/100BASE-T Sbus Ethernet adaptor
Cables	
901-094-00	208V power cord

Test Computer Parts

When ordering replacement parts, refer to the following tables to determine the appropriate part number.

ELMA Test Computer Group Replacement Parts

Teradyne Part No.	Description
425-018-00	Nat. Inst. IEEE GPIB board
425-307-00	Nat. Inst. IEEE Bus expansion option

Teradyne Part No.	Description
425-400-00	2 Processor 150MHZ CPU-24 BD (64Mbyte)
425-400-01	4 Processor 150MHZ CPU-24 BD (128Mbyte)
425-400-03	1 Processor 150MHZ CPU-24 BD (64Mbyte)
425-401-00	9U ELMA card cage
425-409-00	ELMA card cage power supply
426-148-00	Allied Telesyn 10BASE-T Hub 8 Port
800-594-00	ELMA card cage power cord
879-700-03	AD700-03 Terabus adapter board
949-634-00	LA634 BIF board
471-654-00	ELMA card cage fan tray (older version)
471-656-00	ELMA card cage fan tray (new version)

Ultra 5/10/60 Computer Parts

Ultra 5 User Computer Group Replacement Parts

Teradyne Part No.	Description
Internal Components	
425-423-02	Ultra 5 Computer
425-434-00	CD ROM, internal 24x
425-439-00	Power supply, 200 W
425-440-00	Fan assembly, 8 CM
425-441-00	PCI riser card
425-457-00	Processor module 270 MHz
425-457-01	Processor module 333 MHz
425-450-00	Disk drive 4.3 Gbyte internal
425-422-01	Disk drive 8.4 Gbyte internal
425-454-00	Disk drive 9.1 Gbyte 7200 RPM internal
425-451-00	Floppy drive assembly, 1.44 Mbyte, 3.5 inch
425-463-00	Sun PGX color frame buffer, Ultra 5/10/60
425-462-00	Sun, PCI RS232 expansion bd
425-311-00	Sun, 9.1 Gbyte Ultra SCSI external hard drive
External Components	
425-431-00	Sun X6540A SCSI host adapter
425-432-00	Natl. Instr. PCI-GPIB interface
425-437-00	Type 5 mouse

Teradyne Part No.	Description
425-461-00	Type 6 mouse
425-438-00	Typw 5 keyboard with cable, US Ultra 5
425-460-00	Type 6 keyboard
425-468-00	Disk drive, 9.1 Gbyte external, Ultra SCSI The following pns are internal parts of the 425-468-00: • 425-456-00 9.1 Gbyte replacement disk • 425-458-00 PCB interface, 9.1 Gbyte Ultra SCSI ext HDD • 425-455-00 power supply, 30 W internal 9.1 Gbyte ext HDD
Cables	
425-436-00	Monitor adapter cable, HD15F
807-377-00	Cable, Ultra 5 to Ultra 10/60
807-385-00	Power cable, 120 Vac Ultra

Ultra 5 or 10 Replacement Parts

Teradyne Part No.	Description
425-435-01	DIMM, 32 Mbyte
425-435-00	DIMM, 64 Mbyte
425-435-02	DIMM, 128 Mbyte
425-449-00	Motherboard (no CPU module included)

Ultra 10 Replacement Parts

Teradyne Part No.	Description
Internal Components	
425-470-00	Ultra 10 Computer
425-442-00	9 CM Fan Assembly
425-444-00	PCI Riser Card
425-457-00	Processor Module, 360MHz

Ultra 60 Replacement Parts

Teradyne Part No.	Description
425-466-00	DSIMM, 64MByte
425-448-00	Power Supply, 350W
425-447-00	Fan Assembly
425-445-00	Motherbord (no CPU)
425-473-00	Ultra 60 DIMM, 128 MByte

Teradyne Part No.	Description
425-474-00	Ultra 60 Processor Module, 450Mhz
425-483-00	Ultra 60 Computer

Peripheral Computer Parts

Peripheral Computer Group Replacement Parts

Teradyne Part No.	Description
804-884-00	Cable from user computer to customer network (private)
425-310-01	Single width anthro cart
425-310-02	Double width anthro cart
425-391-00	RS-232 serial diagnostic plug
800-321-03	Cable Terabus
804-182-00	Cable, 10Base-T Hub to CPU-24/VTF Ethernet 1
804-182-01	Cable, 10Base-T Hub to user computer Ethernet port
804-183-00	Cable 10Base-T to customer network (public)
804-189-00	Cable, user computer port B to CPU-24/VTF Port A
804-316-00	Cable, CPU-24/VTF serial port B to bulkhead
804-331-00	Cable, BIF #1 (BIF board 2x25)
804-333-00	Cable, BIF #2 (BIF board 3x10)
804-335-00	100 MHz Cable BIF clock to LA703
807-243-00	ELMA fan monitor cable
807-268-00	ELMA 10/100 MHz reference module cable
877-386-00	Terabus terminator plug
877-054-01	Cable, IEEE extender port B to bulkhead
901-088-00	Cable, IEEE-488 to IEEE extender port A
425-415-00	Garrett Engineering Magnum 10/100 Base-T Ethernet switching hub

Numerics

10/100Base-T
cabling 178
hub 67
mounting 177

10/100Base-T Hub
installing 177
removing 177

10Base-T
cabling 176
hub 66

10Base-T Hub
installing 175
removing 174

804-182-01 62, 63, 65, 77, 156, 175, 177

804-316-00 39

879-700-03 49

879-701-00 170

901-094-00 77, 78

A

AD703 Board 158

B

Banner Phase 198

BIF Board 47, 162
ELMA card cage 47
installing on the CPU-24/VTF 161
Ultra 5 48

Boot Block 199

Boot Location 189

Boot PROM
Updating 99

Boot Sequence 198

Boot the Sun Blade 2500 Tester Computer After a FRU Replacement 143

Booting the Test Computer 187

Booting the User Computer 185

Broadcast MAC Address Phase 201

C

Cabling
10/100Base-T 178
10Base-T 176
CPU-24/VTF and AD703 board 158
CPU-24/VTF to user computer 157
ELMA test computer 156
IEEE 165
SCSI Peripherals 76
Ultra 1 78
Ultra 10 114
Ultra 5/10/60 112
Ultra 60 115

CD-ROM drive
SS5
removing 92

Changing a Catalyst Test System's

Network Configuration 147

Checkers 196
- plfal_st 196
- pmm_st 196
- vhf_st 196

Checklist
- servicing the ELMA test computer 150
- servicing the SS5 or Ultra 1 user computer 74
- servicing the Ultra 5, Ultra 10 or Ultra 60 computer 110

Common Commands 183
- floppy tar 184
- tape tar 184
- tip 188

Connect the Sun Blade 2500 Cables 134

Connectors
- CPU-24/VTF 37
- SS5 8

Covers
- operator side 154
- system
  - removing 154

CPU-24/VTF
- connectors 37
- determine processors 195
- front panel 36
- installing 160
- Mbus slots 30
- memory module 31
- processor module 30
- removing 160
- removing the BIF board 161
- sbus slots 32
- Serial Ports 193
- switches 32
- with 949-634 BIF 48

CPU-24/VTF and BIF Boards 162

D

databus_st Failure 196

Disconnect the Cables 128

E

ELMA Card Cage
- back panel 166
- back panel cabling 159
- back panel connector 167
- backplane 27
- BIF Board 162
- cooling fans 27
- Cover 155
- CPU-24/VTF board 29
- location 25
- power supply 26
  - installing 167
  - installing the fuse 168
  - location 166
  - measuring voltages 167
  - removing 166
  - Voltages 167
- removing the cover 155
- slot descriptions and jumper settings 27
- TBA board 49
- VME jumper locations 27

ELMA Test Computer 23
- cabling 156

Ethernet 40
front panel connector 40
fan assembly tray location 169
force computer CPU-24/VTF board 28
GPIB-488 board 50
IEEE-488 board 164
installing 165
replacement parts 205
Sbus 40
SCSI 1 40
TBA board
installing 163
removing 162

etc/ethers
Editing 191

Ethernet
ELMA Front Panel 40
Switches 100

Ethernet Hub
10Base-T 66

Ethernet Switching Hub
10/100Base-T 67

External Components
SS5 16
Ultra 1 16
Ultra 5 16

External Options
Ultra 18
user computer 16

F

Fans
ELMA card cage 27

Figure
10/100Base-T cabling 178
10/100Base-T hub mounting 177
10Base-T hub cabling 176
879-700-03 TBA board 49
879-701-00 mounting bracket 170
attaching cables to the Ultra 1 floppy drive 91
attaching the Ultra 1 CD-ROM cables 97
Computer Subsystem Flow Diagram 3
disconnect the CD-ROM power supply cable 95
disconnect the power floppy disk supply cable 90
ELMA back panel with power supply 166
ELMA card cage & plexiglas cover (service side) 155
Ethernet hub location 174
IEEE bus extender and mounting assembly 172
Private Network 66
Public Network 64
Public/Private Network 62
rear view of SS5 on computer cart 78
rear view of Ultra 1 on computer cart 79
rear view of Ultra 5 on computer cart 113
SS5 internal components 5
Stand-Alone network 63
test computer sled 117
Ultra 10 connectors 44
Ultra 10 internal components 41

Ultra 10 rear view 45
Ultra 60 Internal Components 42
Ultra 60 rear view 46

Firmware 198

Floppy Drive
removing
SS5 87
Ultra 1 89

floppy tar 184

Flow Chart
Computer Subsystem 3

G

GPIB Board 50
Ultra 5 50

GPIB Bus Extender
location 51

GPIB Bus Extender Option 51

GPIB-488 Board
ELMA 50

H

Hard Disk Drive
removing
SS5 84
Ultra1 87

Hardware phase 200

hme 71

I

IEEE Bus Extender
installing 171
removing 171

IEEE-488 board
removing
ELMA 164

Install the Bus Interface Board 140

Install the General Purpose Interface Bus Board 138

Install the RS232 Board 137

Install the Sun Blade 2500 Tester Computer 129

Install the Sun Sun Blade 2500 Tester Computer Components 135

Install the Terabus Adapter Board 142

Install the Terabus Adapter Cable 143

Install the Terabus Terminator Board 142

Installing
10/100Base-T Hub 177
10Base-T hub 175
BIF board
CPU-24/VTF 161
CD-ROM Drive
SS5 93
Ultra 1 94
CPU-24VTF 160
floppy drive
SS5 87
Ultra1 91
Hard disk drive
Ultra 1 86

IEEE bus extender 171
IEEE-488 Board
ELMA 165
motherboard
SS5 103, 105
power supply
ELMA 167
SS5 82
Ultra 1 83
Sbus Boards
SS5 100, 101
Installing the Sun Blade 1500 User Computer FRUs 125
Installing the Sun Blade 1500 User Computer Monitor 124

J

Jumpers
ELMA 27
RS232/423 Jumpers 106

K

Kernel 200

L

le 71

M

MAC Addres 201
Memory
testing 197, 199
Motherboard
removing
SS5 103
Ultra 1 104

N

Network
Ethernet connection 70
Network Configurations 62
private 66
public 64
Stand-Alone 63
Network Connections 70
Network File System (NFS) 72
Network Information Service 72
Networking Connections
hme vs. le 71
NFS 72
NIS 72
NVRAM 199

O

Ordering Parts 203
Overview 121, 145

P

Parts
Handling Procedures 202

Return Procedure 202

path_to_inst 192

PCI Boards
Ultra 5 47

PCI Bus 14

Peripheral Computer Parts 208

Peripherals
SS5 17

Pinout
keyboard/mouse connector 38
serial I/O front panel RJ-45 connector 39
serial I/O port connector 39

POST 197, 198

Power Supply
ELMA 166
installing 82, 83, 167
removing
ELMA 166
SS5 81
Ultra 1 82

Power Supply Fuse
installing 168

Private Network 66

Processor
SS5 6
Ultra 1 10
Ultra 10/60 43
Ultra 5 14

Public Network 64

R

Reconfiguring Solaris 2 192

Remove Sun Sun Blade 2500 Tester Computer Components 135

Remove the Bus Interface Board 139

Remove the General Purpose Interface Bus Board 137

Remove the RS232 Board 135

Remove the Sun Blade 2500 Tester Computer 127

Remove the Terabus Adapter Board 141

Remove the Terabus Adapter Cable 143

Remove the Terabus Terminator Board 142

Removing
10/100Base-T hub 177
10Base-T Hub 174
CD-ROM drive
SS5 92
floppy drive
SS5 87
Ultra 1 89
hard disk drive
SS5 84
Ultra 1 87
IEEE Bus Extender 171
IEEE-48 board
ELMA 164
motherboard
SS5 103
Ultra 1 104

power supply
ELMA 166
SS5 81
Ultra 1 82
TBA board 162
Test Computer 116

Removing the Sun Blade 1500 User Computer FRUs 122

Removing the Sun Blade 1500 User Computer Monitor 122

Replacement Parts 207
ELMA 205
Handling Procedures 202
Ordering 203
peripheral computer 208
Return Procedures 202
SS5 203
Test Computer 205
Ultra 5 206
Ultra 5 or 10 207
Ultra 5/10/60 206
Ultra 60 207
Ultra1/140 204
Ultra1/170E 205

Replacing the Sun Blade 1500 User Computer FRUs 121

Replacing the Sun Blade 2500 Tester Computer FRUs 126

Restarting 184
boot the test computer 187
boot the user computer 185
edit etc/ethers 191
find test computer files 189
identify test computer 189
monitor network traffic 190
reboot after installing an ELMA card cage board 190
reconfigure solaris 2 192
rename path_to_inst file 192
run checkers and vts 192
set selftest-#megs 197
using Tip Hardwire 188
Verify Boot Location 189
Verify CPU-24/VTF Serial Ports 193
Verify POST 197
Verify RS232 Serial Ports 194

RS232 Serial Ports
Verifying 194

RS232/423 Jumpers
Changing 106
Verifying 106

RS232/RS423 Jumpers
SS5 106
Ultra 1 107

S

Sbus
ELMA 40
SS5 6
Ultra 1 10

SCSI Devices 185

SCSI Host Adapter
installing 115

SCSI ID numbers 77

SCSI Peripherals
cabling conventions 76
change the SCSI ID numbers 77
configuring 75
confirm devices 191

determine ID numbers 76
ID numbers 76
installing host adaptor 115
verify SCSI devices 185

Second Monitor
activating 187

selftest-#megs 197

Serial Connection 70

Serial Interface Connectors 38

Serial Ports
CPU-24/VTF 193

Servicing the Sun Blade 1500 and 2500 Computers 121

set selftest-#megs 197

Shutting down
Test Computer 151
User Computer 77

Software phase 201

Solaris 183
commands 184
reconfiguring 192

Specifications
SS5 5
Ultra 1 9
Ultra 5 13
Ultra 60 43

SS5 4, 82
Cables 77
CD-ROM drive
installing 93
jumper settings 93
removing 92
closing 108
Connectors 7
connectors 8
External Options 16
figures
inserting the hard disk drive 85
inserting the sbus board into position 103
floppy drive
installing 87
removing 87
hard disk drive 84
removing 84
internal components 5
motherboard
installing 103
removing 103
opening 79
optional external components 16
power supply
installing 82
removing 81
processor 6
RAM 6
Replacement Parts 203
RS232/RS423 jumpers 106
Sbus boards
installing 100
Sbus slots 6
Specifications 6

SS5 Peripherals 17

Stand-Alone Network 63

SunVTS 196

Switch Settings 33
CPU-24/VTF
SW2-1 - SW2-4 33
SW3-1 - SW3-4 34

SW4-1 - SW5-4 34
SW6-1 - SW7-4 35
SW8-1 - SW8-4 35
IEEE 164

Switches
CPU-24/VTF 32
Ethernet 100

System Flow 3

System Verification 145

T

tape tar 184

TBA Board 48
ELMA 49
installing 163
removing 162
Ultra 5 49

Terabus Terminator Board 49

Terabus Terminator Bracket 170

Terminator
Terabus 49

Test Computer
booting 187
removing 116
Replacement Parts 205
shutting down 151
Sled 116

Test Computer Boards 46

Test Computer Boot 198
banner phase 198
boot block 199
firmware phase 198
kernel and hardware phase 200
memory tests 199
POST 198
RARP phase 201
Software Phase 201

Test Computer Boot NVRAM Phase 199

Test Computer Sled 117

tip 188

Tip Hardwire 188
shutting down 151

Tip Hardwire Limitations 70

Troubleshooting 196
Checkers 196
databus_st failure 196
POST 197

U

Ulra 1
RS232/RS423 jumpers 107

Ultra 1 8, 83
Cables 78
cabling the CD-ROM 97
cabling the floppy drive 91
CD-ROM drive
installing 94
closing 108
Connectors 10
floppy drive
installing 91
removing 89
hard disk drive
installing 86
removing 87
motherboard
installing 105

removing 104
opening 80
optional external components 16
power supply
installing 83
removing 82
processor 10
RAM 10
Sbus Boards
installing 101
Sbus slots 10
Specifications 9

Ultra 10 41
Cables 114
Connectors 44
Internal Components 41
Rear View 45
Replacement Parts 207
Specifications 43
Test Computer Sled 117
Verifying Serial Ports 194

Ultra 10/60
Cables 113
processor 43
RAM 43
Test Computer Sled 117

Ultra 140 8

Ultra 170E 8

Ultra 5 12
BIF board 48
Cables 112
Connectors 15
Engineering Configuration 12
GPIB board 50
internal components 13
optional external components 16
PCI board locations 47
PCI bus 44
processor 14
Production Configuration 12
RAM 14
Replacement Parts 206
RS232 serial expansion board
RS232 Serial Expansion Board
Ultra 5 51
Specifications 13
TBA board 49
Verifying Serial Ports 194

Ultra 5 or 10
Replacement Parts 207

Ultra 5/10
Servicing procedures 117

Ultra 5/10/60
Replacement Parts 206

Ultra 60 42
Cables 113, 115
Connectors 45
Internal Components 42
Rear View 46
Replacement Parts 207
Servicing procedures 119
Specifications 43
Verifying Serial Ports 194

Ultra External Options 18

Ultra Test Computer 41

Ultra1
internal components 9

Ultra1/140
Replacement Parts 204

Ultra1/170E
Replacement Parts 205

Update the /etc/ethers File 144

Update the Boot PROM 99

User Computer
booting 185
external options 16
shutting down 77

User Computer Peripherals
Ultra 18

Using Sun Documentation 127

V

VME Bus 40

VME Card Cage 26

VME Default Configuration 25

VTS 196